THIRD ANNUAL REPORT

FROM

THE BOARD OF PUBLIC WORKS IN IRELAND.

TO THE LORDS COMMISSIONERS OF HIS MAJESTY'S TREASURY,
&c. &c. &c.

MAY IT PLEASE YOUR LORDSHIPS,

WE have the honour to transmit our Third Annual Report as Commissioners of Public Works in Ireland, with Abstracts of the Accounts for the various services under our charge.

Our proceedings may be classed under the same general heads as formerly; namely,

I.—Loans and Grants for Public Works.
II.—The collection of Repayments of old Loans.
III.—Inland Navigation.
IV.—Fisheries.
V.—Roads and Bridges.
VI.—The Public Buildings in Dublin and Phœnix Park.
VII.—Dunmore Harbour.
VIII.—Kingstown Harbour.

I.—LOANS AND GRANTS FOR PUBLIC WORKS, UNDER THE ACT OF 1 & 2 WILL. IV. c. 33.

In Statement (A.) will be found the particulars of all the Loans and Grants that have already been made, or are under consideration, with such remarks on the state and progress of the several Works as may tend to explain the effect of these advances. Several descriptive plans, memoirs and details of construction are added, which we consider may be deemed interesting.

It will be perceived, that of the 500,000 *l.* provided for Loans by the Act of 1831, engagements have been made to the amount of 393,270 *l.* 18 *s.*, and applications to a large amount have come under consideration, several of which are likely to be followed up. There exists, therefore, a probability, that the whole of this fund will be shortly exhausted; and it will then remain for the consideration of His Majesty's Government and the Legislature, how far it may be expedient to extend the benefits which have undoubtedly been derived from the operation of these Loans, by a further power to make advances.

In addition to the demands upon this Fund for Public Works, the Act of 4th & 5th Will. IV. c. 90, authorized us to make advances to the Ecclesiastical Commissioners to the amount of 100,000 *l.*; 46,000 *l.* of this amount is included in the above sum of 393,270 *l.* 18 *s.*

Of the sums received in repayment of the earlier Loans, we have paid over to the account of the Teller of the Exchequer a total amount of 21,000 *l.*, including the 10,000 *l.* adverted to in our last Annual Report.

By the Act of 1831, 50,000 *l.* were voted for Grants of a moiety of the expense for roads, bridges, and small piers in remote, uncultivated and poor districts; of that vote, sums amounting to 31,609 *l.* 4 *s.* 2 *d.* have been allotted to different objects, and the remainder of this Fund will doubtless also be soon expended. It is one calculated to be peculiarly beneficial to the country, and it is only surprising that advantage has not been taken of it more rapidly. Applications are indeed frequently made for the appropriation of this Grant Money to purposes that have hitherto been considered by the Legislature as only entitled to Loans; but as the object defined by the Act tends chiefly to a general improvement of the poorer classes, and rarely to the immediate advantage of the influential portion of the community, there has been some difficulty in obtaining the moiety of expense to be furnished by the grand juries, or other party interested.

In the management of these Funds, a difficulty (which we fear is irremediable) presents itself in the way of making a most useful class of advances, namely, of small sums to effect improvements which, although not of great extent, may be of considerable importance. This arises from the necessary legal expenses attendant upon a mortgage, which may be as heavy for an advance of 500*l.* as for 50,000*l.* The form of mortgage has, in many cases, been simplified; but various applications are still necessarily waived in consideration of costs for proceedings that cannot be dispensed with under the existing laws.

It may not perhaps be deemed a matter for our consideration; but we beg to remark, that the introduction of Exchequer Bills into Ireland under the Public Works' Act, has been productive of very useful effects to the monied and mercantile interests of the country.

II.—THE COLLECTION AND REPAYMENT OF OLD LOANS.

THE accompanying Return (B.) shows the state of these Loans.

The reduction of the outstanding Debt is in gradual and in general operation, with the exception of those cases where the securities of anticipated tolls and profits have proved inadequate.

III.—INLAND NAVIGATION.

THE Navigations under our charge are,

1. The Tyrone.
2. The Maig.
3. The Upper Shannon.
4. The Boyne.

1. The Tyrone is partly a canal and partly a river navigation, the former extending about four miles from the town of Coal Island to the deep water of the Blackwater, in which it is continued about three miles, and communicates with Lough Neagh by a short cut through the peninsula of Maghery. The tolls received upon the navigation have fallen off of late years.

The Ulster Canal, to connect Lough Erne and Lough Neagh, has been contracted for, and a commencement made. When this Work shall be completed to the Blackwater, it may be expected that the value of the Tyrone Navigation will materially increase; particularly if the collieries in its neighbourhood be worked with spirit, which, as yet, they have not been; and the potteries, for which there is an abundance of excellent clay, be prosecuted with skill and industry.

The expense of maintaining this branch is about 245*l.*; and the receipts from the tolls amount to about 145*l.* annually.

2. The Maig, a river which is navigable from the neighbourhood of Adare, in the county of Limerick, to the Lower Shannon.

The cost of maintenance is, on an average, about 70*l.*, and the receipts about 37*l.* yearly.

3. The Upper Shannon. This is a line of great importance, embracing a course of about 45 miles in length, through the heart of the country. It is not only capable of being made a first rate Navigation, but affords peculiar facilities for the extension of off branches, to a considerable distance, in many directions.

A Parliamentary Committee, last Session, investigated the circumstances of the whole line of the Shannon, and in the anticipation of some decided plan being adopted for its effectual improvement, the expenditure on the works and repairs has

has been reduced to what is absolutely necessary for their maintenance on their present comparatively inefficient scale.

The average outlay has been about 632 *l.* annually; and in consequence of the difficulties of the Navigation, and the charges being extremely low, the receipt from tolls does not amount to more than 108 *l.*

4. The Boyne. The whole of the Navigation of the Boyne, from Drogheda to Navan, comprising a distance of nearly 20 miles, was for many years in the hands of the Boyne Navigation Company; but the title of that Company to levy tolls having been disputed, the opinion of counsel was taken; and it was decided that the lower 12 ¾ miles, from the Carrickdexter Lock to Drogheda, were not legally vested in them, but in the Board of Works. We accordingly took possession in the month of August last.

The tolls promise to be fully adequate for placing and maintaining the Works in good substantial repair.

The very great capabilities existing in Ireland for the improvement of its internal Navigation, and the little advantage hitherto derived from resources so manifestly presented by nature, are too notorious, and have been too frequently remarked upon to require much further comment.

The existing Navigations, which have been created or improved by art, although very beneficial to the country, have, unfortunately, not proved generally successful as speculations to the undertakers. This has arisen from various causes; from want of judgment and skill in their original construction; from former mismanagement; from the enthusiastic feeling peculiar to this country, which leads to an attempt rather to rival what has been done elsewhere than to adapt the work to the necessity of the case; and, lastly, from the formation of the canals preceding in a great degree the general improvement of the country in other respects. Whatever may have been the cause of the failure, it has had the effect of discouraging the prosecution of such objects, unless in those cases where Government holds out the promise of liberal support; such support may be more readily afforded, now that there exists a reasonable anticipation of greater and more general advantage arising from it than could formerly have been contemplated.

The parties now in possession of some of the leading Navigations have latterly adopted a more enlightened and straightforward system of management.

In the earlier days of those establishments every thing appears to have been sacrificed to the immediate profit or advantage of the body of the proprietors, or to the interests of influential persons; the projection and management of the Works were made subservient to these ends; and the parties, not satisfied with partaking of the capital of the Company, even went so far as to distribute as dividends money obtained on loan, and other advances, which have been made for the purpose of improving the Navigation.

The Barrow Navigation is a very creditable exception to this system, having been throughout a well regulated public establishment.

The Works are not only kept in excellent condition, but frequent and important improvements are added, or made in their construction, from the funds of the Company, who have at the same time kept themselves entirely free from debt.

The Directors General of Inland Navigation, in a Report made to Government in 1811, on the affairs of the Barrow Navigation Company, and printed by the order of the House of Commons, stated that "the Company had given their time, their application and their money to the execution and management of this great work for many years, without receiving the smallest return; that they had managed the concern with the strictest honour; and the public gained the fruits of their labour, and were not involved in any distress; and that the weight of their misfortune lay entirely on their own shoulders." And it affords us much satisfaction to be enabled to add, that we have good reason to believe that the same upright, straightforward principles, which called forth the testimony we have quoted, have continued to regulate the management of the Barrow Navigation to the present time.

It will be observed that the Company have now brought forward an application for an advance; and we can only regret that, however reasonable their claim may be, the limits of our powers preclude the possibility of our acceding to it.

IV.—FISHERIES.

We are continuing, as authorized by your Lordships' letter of the 1st August 1833, to complete the temporary repairs to those piers along the coast, erected partially or entirely at the public expense.

After these small works shall be completed, the only duties we now exercise, as successors of the late Fishery Board, will be at an end.

The Act of 59th Geo. 3, c. 109, instituting that Board, gave them extensive powers for the regulation of various matters connected with the Fisheries of Ireland; and as the last Act on that important subject, and that in which all the preceding ones were consolidated, it is naturally referred to in cases of doubt or difficulty.

Parties concerned are in the habit of appealing to this Board for their interference in disputes of contested rights, regarding modes of fishing, and other intricate points connected with that important branch of commerce; and they are even advised to do so by eminent counsel, who find no other legal remedy; while, on the other hand, we are entirely without the means or power of acting on such occasions; for although the Act transferred the powers of the Commissioners, no funds were provided for carrying them into effect.

The Act in question comprehended in its provisions a system of Bounties, which, with other regulations, were placed under the management of a Board in Dublin, aided by an extensive establishment round the coast.

The Bounties commenced in 1819, were renewed by an Act of 1826, and allowed to expire at once in 1830. The establishments on the coast were soon afterwards abolished, and the duty, handed over to the late Board of Inland Navigation, was then reduced to the winding up of the affairs. As the successors of that Board we are completing that operation.

In the meanwhile the whole business of the Fisheries of Ireland remains without regulation, or, which is worse, subject to a law so difficult to enforce, and of so doubtful a character, as to be little better than a dead letter.

The state of Ireland, and the condition of the people, do no not seem, at the present moment, to be well adapted to the extension of this important resource for productive industry; and to this circumstance may be attributed the little attention that has hitherto been directed to the subject; but as the coasts are favourable, and the establishment of a proper system, and of the requisite advantages, might be the means of awakening that spirit of enterprize which the present state of things is only calculated to suppress; it is submitted to your Lordships' consideration whether it would not be desirable to obtain a minute investigation and detailed Report on the whole subject, from persons qualified by talent and experience for such an undertaking. To this Report might be added suggestions for such legislative measures, or other provisions, as might be judged necessary for the increase and revival, or rather the creation, of a resource that, as much, or perhaps more than any other, is productive of hardy and beneficial occupation to the labouring classes.

The small Fishery Piers along the coast, erected in great measure at the public expense, continue to be found, as has been repeatedly represented to your Lordships, of great public advantage; but as no provision was made for their maintenance at the time of their construction, it is very important that this omission should be rectified. Should such a general consideration of the state of the Fisheries take place, as we have ventured to recommend, this is a point that would no doubt press for early consideration.

V.—ROADS AND BRIDGES.

The benefits which the country has derived from the construction of Roads carried, by the aid of Government contributions, through extensive, poor and uncultivated districts which were previously without means of communication, continue to manifest themselves in the most satisfactory manner.

These Roads have been the means of fertilizing the desert, and of depriving the lawless disturbers of the public peace of their place of refuge, affording them at the same time resources for an active, honest industry, of which we must do them the justice to observe, they have not shewn any indisposition to avail themselves.

The following is a list of the Roads constructed under the Act of 3d Geo. 4, c. 34, and consigned to our charge by the late Board of Inland Navigation:

Cork	85	Miles.
Tipperary	41	—
Limerick	31	—
Kerry	33	—
Clare	92	—
Galway	12	—
Mayo	22	—
Roscommon	10½	—
Leitrim	3¾	—
Total	330¼	Miles.

These are all in good condition; and in the course of the last year the following have been added to the number:

Galway	120	Miles.
Mayo	105	—

Others in addition are also now in course of completion, in these two counties, by means of the Parliamentary Grant of 1834; and a still further considerable increase will be made from time to time under the Moiety Grants provided by the Public Works Act.

We cannot lose the opportunity of repeating the declaration of our firm conviction of the good policy of promoting these eminently useful works, by the most liberal and extensive support.

An illustration of the good effects produced by these Grant Roads will be found in Plan, No. 1.

Twelve years since a tract of country 400 square miles in extent, although surrounded by considerable market and post towns, (as Portumna, Loughrea, Gort, Crusheen, Tulla, Feakle, Scarriff and Mount Shannon,) and bordered by a lake for a considerable distance, was wholly without intersecting communications. It comprised the mountainous district heading the waters which flow to the Shannon, on one side, and the Western Ocean, on the other; and dividing the counties of Clare and Galway. The vallies and great portion of the land were naturally of a fertile quality, and capable of considerable improvement by cultivation; but from the want of Roads, it was impossible either to introduce lime or other necessary materials for the improvement of the soil, or to remove its produce; and thus, this part of the country remained in a manner shut out from the world.

The attention of Government was first turned to this direction by the spot being chosen as the asylum of the bands of ruffians, who, under the designation of Terry Alts, Lady Clare, &c. devastated the neighbourhood.

The map shows how this district is now traversed by Roads of recent construction, made by the aid of Government at a cost to the Public (in addition to Grand Jury presentment and private contributions) of little more than 10,000*l.* It is now rapidly becoming a source for the expenditure of a considerable capital in agricultural improvements, not only to the proprietors, but to other individuals taking lands on account of the opening thus afforded for profitable speculation.

Another instance may be mentioned of the benefits of these Government Roads, taken from the Report of one of our officers.

Sixty-three thousand barrels of lime (a sufficient quantity for the reclamation of 1,200 acres of waste land) have been carried into the mountains, in the last year, by means of the Anglesey Roads, in the county Tipperary, which cross this hitherto impracticable country in two directions, at right angles to one another, and are 40 miles in extent.

It only remains to add on this subject, that a general opening of extensive ranges of district now without Roads, such as still exist in Erris (county of Mayo) and some other parts of Ireland, ought, in our opinion, to be considered exclusively a work for the Government of the country. It cannot be accomplished, in the first instance, by other means, owing to the extent and poverty of the district; though the local authorities will assuredly afterwards construct branch and cross

Roads for their own interest, and the proprietors will take up the general works of cultivation and improvement, which may then be applied with effect.

Since our last Report, we have undertaken the maintenance of the following Turnpike Trust Roads, under the provisions of the 102d clause of the Public Works Act, (1st & 2d Will. IV. c. 33,) namely:

Dublin to Mullingar	51	Miles.
to Navan	29	—
to Ashbourne	12¾	—

We have made an offer for the Road from Naas to Limerick, 106½ miles; and have now under consideration that between Antrim and Belfast, nealy 17 miles.

Having once assumed the management of any Roads, we shall be enabled to conduct the care of them with efficiency and economy, in proportion to the number that can be added in the same district or neighbourhood.

By the Act of last Session, Will. IV. c. 91, for the better regulation, for one year, of the Post Roads in Ireland, we are directed to give instructions to the several county surveyors for the repair of such mail-coach Roads as shall be represented to us by the Postmaster-general to require amendment; the cost of such repairs to be paid by Grand Jury presentment.

Very many requisitions have been made, and instructions given, in consequence of this arrangement.

Some delays and difficulties have occasionally arisen from the very heavy engagements pressing upon the county engineers in their ordinary business; they have, however, cheerfully and zealously exerted themselves on this unexpected call, and we have reason to hope the desired object will be effectually accomplished.

The nature of the complaints made on the subject of the state of repair of these portions of Road varies considerably, some involving a much greater extent of work than others; on this account we have adopted a principle, which we ascertained to be in accordance with the opinion of the Postmaster-general, namely, that the Act, being of a temporary nature, did not contemplate giving us the power of making alterations and improvements in the lines or levels; but, simply, called such attention to the state of the surface, drainage and fences, as should prevent danger, difficulty or delay to the mails, arising from defects on those points.

On the subject of the Roads and Bridges in Ireland, generally, we may be allowed to advert to the beneficial effect likely to be produced by the appointment of county engineers under the late Act for the amendment of the Grand Jury laws.

As far as we have been able to ascertain, these gentlemen have very generally commenced their services with zeal and firmness, accompanied by a degree of skill in their business that will tend gradually to the improvement of the communications, and be productive of a considerable saving of expense to the counties.

Their duties are very laborious, and their remuneration small, particularly when it is taken into consideration that the expenses previously incurred, either by the counties, or by individuals for the same services, (in general much more imperfectly performed) must have exceeded what is allowed to them, to a great amount.

We have been induced to advert to this subject from having been examiners of those gentlemen as candidates for the situation, and consulted on the arrangements.

VI.—THE PUBLIC BUILDINGS IN DUBLIN AND PHŒNIX PARK.

THE Buildings comprehended under this head are—

1. Dublin Castle:

   State Apartments of the Lord Lieutenant;
   Residences of the State Officers;
   Offices of the Chief and Under Secretaries, of the Council, Treasury, and Exchequer, &c.;
   Chapel Royal;
   Gates and Guardhouses.

2. The Four Courts:
   The several Courts of Justice, and Law Offices connected therewith.
3. The Prerogative Court and Offices at the King's Inns, with the Registry of Deeds' Office.
4. The Custom-house:
   Offices of Public Works and Record Department, and the external and other general repairs to the whole building.

Besides the Prison of the Four Courts Marshalsea, the Insolvent Debtors Court and Offices, the Royal Chapel at Ringsend, &c.

In the Phœnix Park:

The Vice-regal and Secretaries' Lodges and Demesnes. All the Works connected with the Park, exclusive of the above, are managed by the Woods and Forests Department.

Of these buildings some have, within the last two years, been put into a tolerably respectable state; others will require further improvement and additional furniture before they can be considered in a condition which would subsequently merely call for maintenance and repair.

A very extensive undertaking is now pending for the convenience of the law departments at the Four Courts, and for the security of that extensive building and its valuable records.

An elaborate Report on this important matter, by a body of Commissioners of high authority, was published, by order of the House of Commons, in 1813, 1814 and 1815. It represented the inadequacy of the accommodation, the propriety of a better arrangement, and above all, the necessity of insulating that very valuable establishment from the immediate proximity of the low class of houses by which it is surrounded.

No remedy has, however, as yet been applied to this evil, and it has increased in a great degree to the present day.

In the year 1832, an Act was passed, authorizing the expenditure of 4,000 *l.* from the Suitors' Fund, for the erection of a Nisi Prius Court, the execution of which has been delayed by unforeseen circumstances.

About the same period the Benchers of the King's Inns proposed to purchase, from the funds at their disposal, ground and premises connected with the Four Courts, for the purpose of building a Law Library, Reading Rooms, and some other accommodations for the Bar and Solicitors of the Courts, at a cost that will probably not amount to less than 30,000 *l.*

Authority was also given, by an Act passed during the last Session of Parliament, for the expenditure of 50,000 *l.* from the Suitors' Funds, for the purpose of insulating the Courts, and providing such additional buildings as should be necessary.

It is now proposed to combine these three objects in one general plan; measures are in progress for taking possession of the surrounding premises, under a valuation that has already been obtained by the Benchers; and our architect has plans for the several buildings in a considerable state of forwardness, in the arrangement of which he has been much assisted by the Building Committee of the Benchers.

VII.—DUNMORE HARBOUR.

The work for the security of the Pier is carrying on in a substantial manner, and at a moderate expense, fixed by contract.

Plan, No. 2, will explain the progress and system of the principal operations.

A steam vessel trading between Dublin and Cork having touched upon the Breakwater at the extreme end of the pier, on entering the harbour, we have ordered a beacon to be placed there.

VIII.—KINGSTOWN HARBOUR.

The construction of a Landing Wharf and Quay has been continued throughout the year with activity.

This Wall is 40 feet in height, and not less in any part than 20 feet below the level of low-water spring tides.

It is for the present to be carried to the length of 400 feet; upwards of 130 feet of coping have already been laid, and the remainder is carried up to various heights, the foundation being nearly completed. We anticipate that the whole will be finished in September next.

It is probable that, for the more convenient and speedy delivery of the Liverpool and Holyhead Mails, the Post-office will desire an extension of this Wharf for that peculiar service. Should such be the case, there would be a great advantage, in economy as well as in other respects, in the immediate continuation of the Work, while all the apparatus, particularly that adapted to the operations under water, is in perfect good condition.

Some other matters of minor importance have also been prosecuted, and granite blocks are in course of preparation for the Pier Heads.

The only urgent work which now remains to be undertaken (exclusive of the consideration of a Wharf for the accommodation of the Mail Steam Packets), is to finish and secure the Pier Heads forming the entrance to the Port.

In their present rough state, the loose rubble stones are liable to be washed into the Harbour, and, in the event of heavy gales with particular winds, much mischief might ensue.

An establishment of the Commissioners, as well as of the contractors, adequate to the Work, has hitherto had ample employment; the quarries are open, and an extensive tramroad from them is necessarily maintained, at a considerable expense, till it shall be completed. An early decision, therefore, upon the manner in which this operation shall be executed, and the provision of funds for its being carried on with every reasonable degree of activity, are matters of deep interest.

The question of the form to be given to the entrance of the Harbour has been, for many years, referred to the Board of Admiralty, who have hitherto found much difficulty in coming to a decision, in consequence of the very great variety of opinions maintained by the seamen and engineers who have been consulted on the subject. The result of the experience of some years, in nearly its present forward state, must, we apprehend, have narrowed in a great degree the inquiry as to probable effects. At all events, much embarrassment in proceeding, and some unnecessary expenditure, will be the consequence of further delay in this matter.

In the course of the year, some Moorings that were much required in the Harbour have been laid down, with the permission and co-operation of the Admiralty, on the most recent and improved system, by Mr. Loane, of Portsmouth Dockyard.

In a few months it was observed that the iron shackles and chains immediately in connexion with the buoys, were in a very rapid state of corrosion. Edmond Davy, esq., Professor of Chemistry to the Dublin Society, was consulted on the subject, and referred the effect to the action of electricity, produced by the conjunction of the lead and copper (with which the bottom and sides were sheathed) with the iron, and recommended insulating the iron from the other metal, which has been effected by cutting off the copper about three inches round the bolt. This has been completely successful in arresting the mischief.

The Professor is engaged in making further experiments, not yet completed, for the preservation of iron in salt-water, by connecting it with zinc. Annexed is his Report.

It may be mentioned that the same inconvenience has not been experienced at Portsmouth, and the only known difference of circumstance is, that at Portsmouth, the buoys are in a rapid current of tide, while at Kingstown they are in perfectly still water.

We transmit a statement of the number of vessels, with their tonnage, which have frequented the port during the last year, by which it will be perceived that there has been in that period a considerable increase in the business, and in the use made of the Harbour.

Independent of the above regular duties, the Board has been called upon to perform many services, and to incur expenses (increasing those under the head of Contingencies) in consequence of references made to them by your Lordships and the Irish Government, on matters connected with Public Works and other subjects, on which they have been considered to have the means of making investigations and reports.

Having thus enlarged on the several heads of the services on which this Board is engaged, we have only now to add, that the progress of the Public Works in Ireland

Ireland, if not so rapid as to keep pace with the sanguine anticipations naturally awakened by the striking local capabilities of the country, is evidently such as gradually tends towards the most desirable results. It is also satisfactory to perceive that these Works are projected and carried into execution on principles more conducive to general and public advantage than has formerly been the case; and that they are already perceptibly producing very considerable moral, physical, and local improvement throughout the country.

We have the honour to be,

Your Lordships' most obedient humble servants,

J. F. BURGOYNE,
BROOK T. OTTLEY,
J. RADCLIFF.

Office of Public Works, Custom-house, Dublin,
31 January 1835.

APPENDIX.

Sir, Royal Dublin Society's Laboratory, 22 Dec. 1834.

I HAD the honour of receiving your letters of the 12th and 15th of November, informing me "that the Commissioners are very desirous of trying the experiment proposed by me of the application of zinc to the iron bolts and shackles of the buoys in Kingstown Harbour, to prevent the rapid corrosion that has been taking place, and that they would prefer such an experiment being made under my direction."

I now beg leave to acquaint you, for the information of the Commissioners, that I commenced my experiments on one of the buoys at Kingstown Harbour on the 26th November, and continued them on another buoy on the 19th December, in company with the harbour-master, who kindly afforded me every facility in his power.

The buoy on which I first operated (being the only one on shore) was unfavourably circumstanced for my experiments, because none of the lead had been removed from its lower surface, and the iron shackles and bolts attached to it were very much corroded. The principal corrosion, however, appeared to have taken place near the lead at the bottom of the buoy, or within a short distance of it. My first experiment was designed to ascertain whether a given weight of the corroded iron work connected with the buoy would, when protected with a sufficient surface of zinc, undergo any farther corrosion, or lose any weight in sea water. Accordingly the iron shackle, link, nut and forelock, immediately close to the buoy, weighing together 57 lbs., had attached to them four small ingots of zinc.

On the 15th December, I examined this experiment. Owing to a strain on the iron shackle, one of the pieces of zinc had been forcibly removed; but the appearance of the iron in the vicinity of the other pieces of zinc was quite different from that of the unprotected iron, and much more free from corrosion than on the 26th November; the recent state of the experiment prevented me from trying if the iron work had lost any weight.

On the 19th December, my experiments were made under more favourable circumstances than before; the buoy on which I operated having had a portion of lead removed from its bottom, and the shackles and bolts being made clean. I have also made subsequent experiments with zinc, as a protector to iron in sea water, and instituted comparative experiments in the harbour, to ascertain the rate of the corrosion of known weights of iron chain when unprotected, and the precise difference of effect when protected; also, whether bright surfaces of iron will oxidate or corrode when protected by zinc; but all these experiments have been too recently made to state the results.

I beg leave to state that I have had repeated opportunities during the last week (in company with the harbour-master) of examining those buoys, which, agreeably to my suggestion in July last, had about three inches of lead removed from their bottoms, so as to break all connexion between the iron shackles and the lead and copper coating the buoys. Some of the buoys so treated have been down nearly six months, and I have no hesitation in saying, I consider the alteration a most beneficial one, and connected with the permanency of the iron work. My opinion is founded on comparing these buoys with the buoys from which none of the lead has been removed. In the former, the corrosion of the iron work seems to be very nearly arrested, and the shackles, &c. have become the abode of myriads of marine insects. In the latter, the iron work is strongly corroded, and exhibits no vestige of animation on its surface.

As the buoys at Kingstown Harbour are said to be of similar construction to those now in use at Portsmouth, and the latter, according to Mr. Loane, pilot-master, do not exhibit any such corrosion as the former, he has referred the cause of the corrosion "to the stillness of the water at Kingstown Harbour, allowing the copper to act against the iron in a greater degree than it does at Portsmouth, owing to the greater run of tide there, which carries off the attractive influence, and it may be assisted by the lead being secured with metal nails."

I have had no opportunity of comparing the buoys at Portsmouth with those at Kingstown; but it appears to me that very slight differences in construction may occasion a material difference in the corrosion of the iron work; and even admitting the exact similarity of construction of the buoys at both places, it is possible that a considerable degree of corrosion may take place in the iron work of the buoys at Portsmouth, without being apparent to superficial observation, the loose oxide being carried off by the strength of the tide.

The striking manner in which the corrosion of the iron shackles and bolts has been arrested, on the removal of part of the lead from the bottoms of the buoys in Kingstown Harbour, seems to show that the previous rapid corrosion was in consequence of the connexion of the iron with the lead and copper covering the surface of the buoys, and that the effect was at first justly referred by me to electricity or electrical action.

I have, &c.
(signed) *Edm. Davy.*

Henry R. Paine, Esq.
Secretary to the Commissioners of Public Works, &c.

RETURN of VESSELS that have frequented *Kingstown Harbour* during the Year 1834.

—	Number.	Tonnage.
Vessels that have cleared out from an English, Irish, Scotch, or foreign port, and bound to an Irish port (not including Dublin), wind-bound or taking shelter	245	17,681
Vessels that have cleared out from an English, Scotch, or foreign port, bound to England or Scotland, wind-bound or taking shelter	73	7,708
Vessels trading to or from the port of Dublin; waiting for tide or wind	1,054	156,945
Revenue cruizers and men of war	30	—
Vessels from Irish ports to English, Scotch, or foreign ports, taking shelter or wind-bound	143	11,949
Vessels from English and Scotch ports to foreign ports taking shelter and wind-bound	36	4,924
Vessels to Kingstown or the old harbour of Dunleary	118	14,098
Total	1,699	213,305

Mem.—The tonnage, &c. of steamers, waiting tide at Kingstown, amounts to 374 vessels, 79,257 tons, and is included in the item, in the above Return, of vessels to and from the port of Dublin. The tonnage of steamers plying as packets to Kingstown, men-of-war, post-office or merchants, is not specified.

(signed) *Wm Hutchison*,
Harbour-Master.

Kingstown, 7 January 1835.

(A.)—STATEMENT of the several LOANS made by the COMMISSIONERS of PUBLIC WORKS in *Ireland*, pursuant to the Provisions of the Act 1 & 2 Wil. IV. c. 33, up to the 1st of January 1835.

No.	OBJECT	AMOUNT of LOAN Sanctioned.			AMOUNT of EXCHEQUER BILLS Issued on account of each.			REPAYMENTS.						STATE AND PROGRESS OF WORKS
								PRINCIPAL.			INTEREST.			
		£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.	
1	Road from Drumma to Bundoran, county Leitrim	2,511	17	5	2,500	–	–	402	10	4	266	5	2	* Thus marked were reported to have been *completed* in last Report
2	Road from Kilkenny to Freshford, county Kilkenny	623	–	–	600	–	–	176	12	9	56	19	9	*
3.	Completing the works of Ardglass Harbour -	6,650	–	–	6,650	–	–	-	-	-	-	-	-	*
4.	Working of the quarries at Valentia - -	7,000	–	–	7,000	–	–	-	-	-	230	–	8	- - The preliminary steps are made for bringing these works into considerable activity. About 170 men are now employed. The flagging and landings are reported to be of a very superior kind in quality and dimensions, single slabs of 50, 60, and even up to 90, superficial feet being readily obtained, and are now habitually shipped for the London market
5.	To improve the works of the Limerick Navigation Company	8,910	–	–	8,500	–	–	-	-	-	661	4	3	- - Completed.
6	Ennis Road, through the liberties of the city of Limerick	205	–	–	200	–	–	110	16	8	17	5	10	- - Completed.
7	Waterford Road - - ditto - - -	560	–	–	560	–	–	302	17	11	47	8	3	- - Completed
8.	Drainage of farms near Nenagh, county Tipperary.	200	–	–	200	–	–	-	-	-	15	–	–	*
9.	Erecting machinery, Cronebane copper mines, county Wicklow.	1,000	–	–	1,000	–	–	484	11	5	85	10	2	*
10.	In aid of machinery, Ballymurtagh mines, county Wicklow.	1,000	–	–	1,000	–	–	-	-	-	59	1	11	*
11	Road from Clogheen to Cappoquin, county Tipperary	1,278	11	10	1,250	–	–	434	17	1	44	12	2	- - Completed
12.	Ditto - - - - - - county Waterford	1,895	12	7	1,850	–	–	1,004	8	7	39	10	9	
13	Building a court-house at Carlow - -	5,000	–	–	5,000	–	–	2,154	5	4	315	14	8	*
14.	Continuing Quay-wall at Claddagh, Galway -	300	–	–	250	–	–	61	6	2	10	13	10	
15	Completing the Wellesley Bridge and Docks, Limerick.	25,000	–	–	19,300	–	–	1,250	–	–	658	14	10	- - The continuation and termination of these works have been still delayed, to a much greater extent than could have been anticipated, owing latterly to the great difficulty that has been found in the obtaining of transport from Liverpool for the iron beams of the large swivel-bridge, which are unmanageable both in mass and shape; but assurances are given that they will be immediately transmitted
16	Road from Strokestown to Lung Bridge, county Roscommon	7,111	8	11	4,680	–	–	2,069	2	2	64	3	6	- - This work is in considerable forwardness, and expected to be completed during the ensuing summer. The works are reported by the county engineer to be substantially and properly executed.
17	Slate quarries near Killaloe - - -	500	–	–	500	–	–	-	-	-	28	19	6	*

18	Athlunkard Bridge and approaches thereto, over the river Shannon	9,889	19	2	9,850	–	–	-	-	-	152	17	4	- - Completed.
19	—	—			—			—			—			—
20	Constructing a floating-dock at Galway	17,000	–	–	4,000	–	–	636	5	7	212	11	10	- - No great progress yet made, and the recent death of the contractor has still further retarded operations, but measures are taking for their being again renewed with more activity
21	Road between Castlerea and Ballinasloe, near Ballygar, county of Galway.	346	8	3	300	–	–	94	17	4	10	8	8	- - This road was completed according to the original design, but it has been found necessary to give increased water-way to a bridge on the line, and to raise a part of the road which was liable to be flooded, which works are in progress
22.	Road between Ennis and Ballinasloe, near Lough Graney, county of Clare	1,153	1	7	800	–	–	465	18	6	9	4	1	- - Of these roads the cuttings, embankments, formation and fences are completed, excepting over bog lands, which still require consolidation by the drainage of this winter Nearly all the bridges and masonry are executed, and large quantities of broken stone are prepared It is expected that they will be opened during the coming season.
23	Road, continuation of same to Derrybrien, county of Galway	534	4	2	500	–	–	221	3	7	4	4	5	
24.	Bridge over the Bann, at Agivey, county Londonderry	1,250	–	–	1,250	–	–	162	3	9	25	6	3	- - Completed.
25	Ditto - - ditto - - county Antrim	1,250	–	–	1,250	–	–	340	16	7	24	15	11	
26.	Road from Larne to Ballycastle, county Antrim	11,303	4	–	9,000	–	–	2,699	12	1	83	16	–	- - This arduous undertaking has been persevered in with activity The line round the Little Deer Park at Glenarm (by which a very steep road over a mountain 675 feet high has been exchanged for one on nearly a perfect level,) has been opened to the public, although still requiring some fences and finishing Another short line on a level, avoiding steep rises of about 100 feet, has also been opened, and other parts are in progress Mr Bald's Remarks on the construction of Bog Roads, in Appendix, and Plans Nos 3 to 17, will illustrate the nature of some of the details of the works on this line
27.	Road from Carrickfergus to Antrim and Larne	1,485	1	8	-	-	-	-	-	-	-	-	-	- - Some embarrassment has arisen on this line, owing to the proprietor of a mill objecting to the road going through his premises, and the road commissioners not being willing, or being apprehensive of not having power, to accommodate him by altering it.
28.	To improve the Newry Navigation	10,000	–	–	5,000	–	–	489	14	10	150	18	8	- - Several passages in the river that were narrow, and obstructed with rocks and stones, have been greatly opened, so as to admit a very considerable increase to the tidal and navigable water above. Shoals have also been deepened by the steam dredge belonging to the Navigation, and there is a prospect of obtaining the admission of steam trading vessels, and the ordinary sized foreign vessels frequenting the port, up to Fathom Lock, (one mile and three quarters below Newry) instead of being obliged, as at present, to discharge at Warren Point, at the mouth of the river
29.	Drainage of farms, Earl of Bessborough, county Kilkenny	2,000	–	–	1,150	–	–	-	-	-	-	-	-	- - All the projected work, and some approved additions, have been executed, or are in progress, and his Lordship's agent reports that the object has exceeded their most sanguine expectations, and he has no doubt will be completely successful in every respect.
30	Road from Dublin to Blessington	3 500	–	–	2,750	–	–	175	–	–	28	3	8	- - The works for which the loan was obtained are approaching towards completion The trustees have recently employed a capable engineer to direct the repairs.

(continued)

No.	OBJECT	AMOUNT of LOAN Sanctioned.	AMOUNT of EXCHEQUER BILLS Issued on account of each.	REPAYMENTS. PRINCIPAL.	REPAYMENTS. INTEREST.	STATE AND PROGRESS OF WORKS
		£. s. d.	£. s. d.	£. s. d.	£. s. d.	
31.	Railway from Dublin to Kingstown - -	75,000 - -	74,000 - -	- - -	- - -	- - The operations comprehended in the original Act of Parliament, as amended in the second, (exclusive of the proposed extension) are completed, and, generally speaking, in an able manner, forming a very splendid work. Some little failures in execution, inseparable from a great undertaking carried on with much rapidity, will, by degrees, be remedied; they do not at all affect the working of the road. The railway was opened to the public on the 17th of December, and has been worked on regularly and successfully since. The number of passengers conveyed on it up to the 1st of January (15 days) has been 35,041. The locomotives, machinery, carriages and establishments generally, are very complete, and of first-rate order, and there cannot be a doubt but that the whole undertaking will prove a great convenience, as well as a source of enjoyment, to the inhabitants of Dublin and its neighbourhood. Thomas F. Bergin, esq., secretary to the Company, has applied to the carriages a spring bar (for which he has obtained a patent,) admirably adapted to ease the shock of sudden stopping or putting in motion; while at the same time it is more strong, more simple, and much more economical, and attended with other great advantages over the system hitherto adopted. A description, with drawings, Nos. 18, 19 and 20, are annexed.
32.	To improve the harbour of Drogheda - -	10,000 - -	4,000 - -	- - -	- - -	- - Mr. Bald's (the engineer) Report on the state of these works will be found in the Appendix.
33	Road from Loughrea to Derrybrien, county Galway	720 - -	400 - -	200 4 7	2 5 5	- - The cuttings, embankments, formation and fences are completed, excepting over bog lands, which still require consolidation by the drainage of this winter. Nearly all the bridges and masonry are executed, and large quantities of broken stone are prepared. It is expected that this road will be opened during the ensuing season.
34	Completing repairs of road leading to Waterford, through Limerick.	496 3 6	490 - -	133 10 5	14 11 3	*
35.	Ditto - - - - Ennis - - - - ditto	117 6 8	100 - -	54 7 6	4 10 10	*
36	Road from Abbeyfeale to Glin, county Limerick	1,181 15 3	700 - -	305 6 4	1 18 8	- - This work is in course of execution, and a favourable report has been lately received of the progress made.
37	Bridge over the river Inagh, near Liscannor, county Clare.	2,222 14 -	1,200 - -	901 18 11	15 4 1	- - Proceeding in a substantial manner; great precautions were necessary in getting in the foundations; one abutment alone remains to be raised previous to throwing over the arches, and a large quantity of materials is prepared. This bridge is very close to the sea, and will be of considerable utility in connecting the coast roads.

38.	Road from Kenmare to Glengarriff county Cork	2,737 16 –	1 250 – –	998 16 3	13 6 8	- - An expenditure to the amount of 7,891*l.* has been made on this 17 miles, and a great extent of drainage, cuttings, embankments and masonry completed in the rough, which cannot, in their present state, be described without going too much into detail. The works are going on satisfactorily.
39	Same road, county Kerry - - - - -	5,865 18 –	2 750 – –	2,445 15 3	17 18 6	
40	Road from Five Mile Town to Clones, county Fermanagh	2,600 – –	1,500 – –	869 9 6	- - -	- - The works are progressing, but not quite in so satisfactory a manner as is desirable
41	Road near Meelick to Cratloe Hill, county Clare.	1,450 – –	1,200 – –	658 17 5	67 0 7	- - Nearly completed.
42	Road from Portumna to Mount Shannon, county Galway	2,178 – –	900 – –	424 16 1	4 12 4	- - This road is in a forward state, but the portion over bog will still require time for the action of the drainage in its consolidation
43	Road from Omagh to Cookstown, county Tyrone	2,334 – –	2,050 – –	172 14 –	6 8 2	- - Finished, but not yet taken off the contractor's hands.
44.	Road from Bailieborough to Virginia, county Cavan	1,936 – –	900 – –	- - -	- - -	- - This work is in progress.
45	Road from Castinaveena Coal pits to Dromahair, county Leitrim	1,043 – –	500 – –	278 9 1	10 18 11	- - In progress, but carrying on rather slowly.
46.	To complete a Roman-catholic chapel at Bruree, county Limerick	150 – –	150 – –	- - -	- - -	- - Completed
47	Road through liberty of Waterford, and part of road to Tramore	1 550 – –	600 – –	477 – 6	- - -	- - In a forward state, and expected to be completed during the ensuing summer

Note.—The foregoing Loans had been concluded at the period of making up the last Annual Report, the following have been since effected:

48.	For improvements to the harbour of Ballyshannon, county Donegal.	5,000 – –	- - -	- - -	- - -	- - Colonel Conolly has hitherto expended his own money, and not demanded any advance on account of this loan, consequently no inspection has been made on the part of this Board. A Report by the engineers of the works, Messrs. Stevenson, is transmitted, which the Board have reason to believe is very correct. The Report is accompanied by a Plan, No. 24.
49	Road from Johnstown to Bawn, county Kilkenny	180 – –	150 – –	11 0 6	2 10 6	- - Nearly completed; expected to be finished in spring
50	Road from Killaloe to Tomgraney, county Clare	2,850 – –	350 – –	- - -	- - -	- - This will fill up a link in the chain of roads through the country that is much wanted; besides which, it skirts Lough Derg, giving the neighbouring country the benefit of its navigable communication to Limerick and Dublin, and the power of resorting to the inexhaustible supply of rich marl which forms the great part of its bed; a substance so valuable to the agriculturist, that the lake may be considered a mine of wealth to the country. The work is proceeding satisfactorily, both in execution and economy.
51	To complete a Roman-catholic chapel at Buttevant county Cork	600 – –	- - -	- - -	- - -	- - The bond of security is not yet completed
52	Road from Derrygonnelly to Manorhamilton, county Fermanagh	2,350 – –	- - -	- - -	- - -	- - This work is in progress
53.	Turnpike road between Dublin and Mullingar	3,000 – –	1,500 – –	- - -	- - -	- - This Board having, under the provisions of their Act of Parliament, entered into a contract with the trustees to undertake the repairs of this road, the loan for putting it in the first instance into a proper state, though made to the trust, is being expended under the directions of the Board. The work is proceeding satisfactorily, and it is intended that this important thoroughfare from the metropolis shall by degrees be put into and maintained in a respectable state.

(*continued*)

(A.)—STATEMENT OF LOANS—*continued.*

No.	OBJECT.	AMOUNT of LOAN Sanctioned.			AMOUNT of EXCHEQUER BILLS Issued on account of each.			REPAYMENTS.						STATE AND PROGRESS OF WORKS.
								PRINCIPAL.			INTEREST.			
		£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.	
54.	Road from Kilkenny to Filtown, county Kilkenny	1,050	–	–	350	–	–	46	2	7	5	6	5	- - This work is in progress.
55.	Road over Cratloe Hill to Moyhill, co. Clare	1,700	–	–	-	-	-	-	-	-	-	-	-	- - This is a continuation of the road for which loan No. 41 was made. There has not been any inspection of the work, no application having as yet been made for an instalment on the loan.
56	Road from near Ross to Ballyane, co. Wexford	2,800	–	–	-	-	-	-	-	-	-	-	-	- - No application for an advance has been made on this loan, consequently there has not been an inspection of the works.
57	Boyne Navigation from Carrick Dexter Lock to Drogheda.	1,750	–	–	500	–	–	-	-	-	-	-	-	- - This navigation is in the hands of the Board of Public Works, who are waiting the proper season for putting the same into a substantial state. In the meantime some small urgent repairs have been made.
58	Road from Mullins to Gweedore River, county Donegal.	750	–	–	750	–	-	66	5	6	8	14	7	- - Considerable progress has been made in the works of this road, which is in a wild uncultivated district, for the opening of which a grant has been made concurrent with this loan.
59	New bridge at Belturbet, county Cavan	1,700	–	–	-	-	-	-	-	-	-	-	-	- - No advance has yet been made or applied for.
60	Road from Carnew to Tullow, co. Wicklow	2,000	–	–	-	-	-	-	-	-	-	-	-	- - No advance has been made, and it is understood none will be required.
61.	For rebuilding Thomond Bridge, city of Limerick.	9,000	–	–	-	-	-	-	-	-	-	-	-	- - The old Thomond Bridge, till very recently the only one over the Shannon at Limerick, has been for years in a dilapidated state, and was in part carried away in the winter of 1833. This loan is to rebuild it substantially, and in a more convenient form.
62.	Improvement in turnpike road from Dublin to Dunleer.	1,600	–	–	-	-	-	-	-	-	-	-	-	- - The trustees have agreed to expend a considerable sum from the funds of the trust before applying for an advance on account of this loan.
63.	Road from Bailieborough, by Moynalty, to Kells, co. Cavan.	898	15	–	-	-	-	-	-	-	-	-	-	- - No advance has been made or applied for.
64.	For clearing away a mass of very bad buildings in Barrack-street, for an improved entrance to the city of Dublin. (Wide street Commissioners.)	25,000	–	–	-	-	-	-	-	-	-	-	-	- - The removal of these buildings is not yet commenced.
65.	The Ecclesiastical Commissioners, pursuant to Act 4 & 5 Will. 4, c. 90.	46,000	–	–	-	-	-	-	-	-	-	-	-	- - This loan is in pursuance of the Act 4 & 5 Will. 4, c. 90. The principle on which the mortgage deeds are to be drawn has not yet been decided.
	£	381,770	18	–	195,450	–	–	20,796	19	10	3,435	9	1	

STATEMENT of the several GRANTS made by the COMMISSIONERS of PUBLIC WORKS in *Ireland*, pursuant to the provisions of the Act 1 & 2 Will. IV. c. 33, up to the 1st of January 1835

No.	OBJECT	AMOUNT of Grant Sanctioned.			TOTAL.			AMOUNT issued from Treasury on Account of Grants.			STATE AND PROGRESS OF WORKS
		£.	s.	d.	£.	s.	d.	£.	s.	d.	
1	To complete a fishery pier at Rathcourcey, county Cork	218	18	–	-	-	-	157	2	6	- - Completed.
2	In aid of Lough Graney Road, county Clare	1,319	17	3	-	-	-	1,000	–	–	- - These works are explained under the head of Loans, Nos. 22 and 23
3	Same - - continuation to Derrybrien, county Galway	534	4	2	-	-	-	534	4	2	- - *See* Loans, No. 33.
4.	For a road and quay at Garrakennedy, Lough Derg, River Shannon	635	15	4	-	-	-	200	–	–	- - The road has been opened to the public, but little progress has as yet been made in the landing place.
5	In aid of a road between Castlerea and Ballinasloe, county Galway	346	8	3	-	-	-	346	8	3	- - *See* Loans, No. 21.
6.	In aid of a road from Larne to Ballycastle, county Antrim	6,845	–	–	-	-	-	5,000	–	–	- - Explained under Loans, No. 26.
7	In aid of a road from Loughrea to Derrybrien, county Galway	1,040	–	–	-	-	-	1,040	–	–	- - Ditto - - - - - - No. 33.
8	In aid of masonry on road from Castlerea to Ballinasloe, near Ballygar	180	–	–	-	-	-	180	–	–	- - Ditto - - - - - - No. 21.
9	In aid of bridge over Liscannor, county Clare	2,224	14	–	-	-	-	1,300	–	–	- - Ditto - - - - - - No. 33.
10.	In aid of road from Kenmare to Glengarriff, county Cork	2,737	16	–	-	-	-	1,337	16	–	- - Ditto - - - - - - Nos. 38 and 39.
11	- - Ditto - - ditto - - county Kerry	5,865	18	–	-	-	-	3,365	18	–	
12	In aid of road from Five Mile Town to Clones, co. Fermanagh	1,028	–	–	-	-	-	1,028	–	–	- - Explained under head of Loans, No. 40
13	In aid of road over the Glenstall Mountains, connecting the Anglesey Road with the Thurles Road to Limerick	700	–	–	-	-	-	700	–	–	- - Considerable progress has been made in this work
14.	In aid of road from Portumna to Mount Shannon, county Galway	2,178	–	–	-	-	-	900	–	–	- - Explained under head of Loans, No. 42.
15	In aid of road from Castinaveena Coal-pits to Drumshare, county Leitrim.	1,043	–	–	-	-	-	500	–	–	- - Ditto - - - - - - - - No. 45
	£	27,595	11	–	-	-	-	17,589	8	11	
	Note.—The above were included in last Annual Report.										
16	In aid of road from Killaloe to Tomgraney, county Clare	950	–	–	-	-	-	650	–	–	- - Ditto - - - - - - - - - No. 50.
17	In aid of road from Mallins to Gurtore, county Donegal	723	10	8	-	-	-	723	10	8	- - *See* Loans, No. 58.
18	In aid of road from Donegal to Pettigoe, county Donegal	2,340	2	6	-	-	-	-	-	-	- - A very useful line to open a country much in want of communication, and particularly worthy of Government aid, since a large proportion of the other moiety is from private contributions
	£.	31,609	4	2	-	-	-	18,962	19	7	

Henry R. Paine, Secy.
Jos. C. Walker, Acct.

LOANS recommended but not yet sanctioned.

APPLICANTS.	OBJECT.	Amount required.			REMARKS.
		£.	s.	d.	
Limerick Navigation Company.	- - For securing and putting into a substantial state of repair the works of the navigation.	6,500	–	–	- - This navigation is increasing rapidly in importance. The profits of the Company cannot exceed 10 per cent. on 3,000*l.* capital; all other returns are available to the maintenence of the line.
Belfast Ballast Board -	- - For the improvement of the harbour.	35,000	–	–	- - This important port is subject to many inconveniences, which, on the advice of eminent engineers, it is hoped may be partially removed by this expenditure, for which the funds produced by the dues promise adequate security.
	£.	41,500	–	–	

LOANS REJECTED.

APPLICANTS.	OBJECT.	Amount required.			REMARKS.
		£.	s.	d.	
Zoological Society -	- - For erection of buildings in their gardens in the Phœnix Park.	1,000	–	–	- - No security could be given.
Patrick Nevin, esq. -	- - Public cemetery near Dolphin's Barn, Dublin.	5,050	–	–	- - Security not satisfactory.
	£.	6,050	–	–	

APPLICATIONS for LOANS or GRANTS that have been submitted to the Board, and may still be subject of Negotiation.

APPLICANTS.	OBJECT.	Sums required.			REMARKS
		£.	s.	d.	
Belfast and Cave Hill Railway Company.	- - For a railway from Belfast to the Cave Hill.	5,000	–	–	- - For a promising delivery and export of limestone. The Board have required the certainty of a larger capital on the part of the Company than at present they appear to possess, and have still information to obtain regarding the Company's tenure.
Directors of the Royal Canal Company.	- - For a canal to connect the town of Roscommon with the Shannon and the Royal Canal.	48,000	–	–	- - The security hitherto offered does not appear adequate.
Rev. John O'Connell, P. P.	- - To build a wall round his chapel at Mitchelstown, county of Cork.	200	–	–	- - The object is not established as of adequate public utility.
John M'Loughlin, esq.	- - For the improvement of a farm in the county of Mayo.	200	–	–	—
Pierce Nagle, esq. -	- - Working a culm-pit at Anakissy, co. Cork.	2,000	–	–	- - The party has been given to understand the opinion of the Board, but has not as yet followed up the application.
John Salmon, esq. -	- - Road from Corbally slate-quarries towards Nenagh, co. Tipperary.	262	18	6	- - Some points remain to be settled regarding the plans and estimates, which were not in the first instance satisfactory.
Lagan Bridge Company	- - For a new bridge over the River Lagan at Belfast.	3,000	–	–	—
Commissioners of Galway Docks and Harbour.	- - For the purchase of land and premises towards the construction of a canal communication from Lough Corrib through the town of Galway.	3,000	–	–	—

Applications for Loans or Grants that have been submitted to the Board, &c.—*continued.*

APPLICANTS.	OBJECT.	Sums required.			REMARKS.
		£.	s.	d.	
Barrow Navigation Company.	-- For improving the navigation, and particularly the construction of a tide-lock at the southern extremity, with a trackway to the town of New Ross.	-	-	-	-- The application that has been as yet before the Board is to make good a claim for a balance on an old proceeding, to comply with which the Commissioners have no authority. The state of this navigation is referred to in the General Report, under the head of Inland Navigation; and Plans Nos. 25, 26 and 27 are descriptive of its state, and explain a considerable work lately executed by the Company.
—	-- A ship canal from Enniscorthy to Wexford Harbour.	50,000	–	–	-- This application had been previously before the Board, and not persevered in at the time. It is intimated, however, that it is likely to be renewed. A plan of the project will be found in No. 28.
Commissioners of Limerick Bridge and Docks - - -	Limerick quays - - -	30,000	–	–	-- It is not known yet what may be the precise sums required for these works, which are on a project of Mr. Rhodes, C. E., printed by order of the House of Commons last session. The plan has met with the approbation of several engineers, and its execution is much sought for by the inhabitants and trading interests of Limerick; and a strong showing of the probable security for considerable advances has been laid before the Board.
	Limerick Docks - - -	55,000	–	–	
Matthew Barrington, esq.	-- For a building in connexion with a public hospital at Limerick.	2,500	–	–	-- This building is for the working of a public loan fund, on the principle of the Monts de Piété on the Continent; the profits, after paying moderate interest to subscribers, to go towards the support of the hospital.
James Molony, esq. -	-- Road from Tulla to Lough Graney, co. Clare.	3,855	2	8	-- This road is required as a link to complete the chain of intersecting communications through the mountainous district of the county of Clare, particularly alluded to in the Report, and is shown by a dotted line on the Map, No. 1.
	£.	203,018	1	2	

GENERAL ABSTRACT.

	£.	s.	d.	£.	s.	d.
LOANS:						
Amount of applications recommended and sanctioned - - -				351,770	18	–
Ditto - - - recommended, and before the Lords of the Treasury - - - - - - -				41,500	–	
Ditto - - - which have been under consideration, and some of which are still subject of negotiation -				203,018	1	2
Amount of Loan, No. 19, not followed up - - - - -				100	–	–
				596,388	19	6
Amount of applications rejected, as returned in 1st Report,	273,773	7	4			
Ditto - - - - - - - - - - 2d Report,	29,000	–	–			
Ditto - - - - - - - - - - last year -	6,050	–	–			
				308,823	7	4
£.				905,212	6	10
GRANTS:						
Amount sanctioned - - - - - - - - - -				31,609	4	2
Ditto rejected on former Reports - - - - - - .				6,140	14	–
Ditto which may still be subject of negotiation - - - -				3,000	–	–
£.				40,749	18	2
Total applications for Loans - - - - - - - -				905,212	6	10
Ditto - - - Grants - - - - - - -				40,749	18	2
£.				945,962	5	–

Henry R. Paine, Secretary.

Dublin and Kingstown Railway.

IMMEDIATELY after commencing the traffic on the Liverpool and Manchester Railway (the first on which long trains of carriages were moved by locomotive engines at high velocities) it was found that every time a train was put in motion or stopped, violent concussions took place between the several carriages, equally disagreeable to the passengers and destructive to the carriages themselves. These concussions arose from the following cause, viz. by reason of the inertia of all heavy bodies, the same engine-power which would be adequate to draw a given load along a railway at any required speed, would not be sufficient to start the same load from a state of rest; it was therefore necessary to connect the several carriages by chains of some considerable length, say three or four feet, by which arrangement the inertia of the train was as it were divided into as many parts as there were carriages, and these several parts being each within the power of the engine, were overcome in succession; but as the first carriage would have attained a certain amount of velocity when the connecting chain came to pull the second, this second must of course be at once dragged from rest into motion at a speed nearly equal to that already acquired by the first, and so on through the entire train. Now a very slight knowledge of the principles of mechanics teaches that the concussions already mentioned were the necessary result of the action described; the same principle (inertia) produced the same effects at stopping a train, and also at every change in the relative velocities of the individual carriages when in motion; and as the force of these shocks was dependent on the velocities, the greater the speed of travelling the more violent they became.

The obvious remedy for the evil complained of was to provide a means by which the full amount of motion acquired by any part of the train should be gradually, not instantaneously, communicated to the other parts; the elasticity of a spring was a suitable means, and an apparatus was accordingly added to the Liverpool and Manchester passenger coaches, a sketch of which is annexed, (fig. 1), and which has been termed a buffing apparatus. An elliptic spring, A 1, A 2, is placed horizontally in the middle of the frame of the carriage, with which the hooks B 1, B 2, for the drawing chains, and the buffer heads or cushions C C, are connected by the several rods and levers represented in the drawing. The action of this apparatus is as follows: if the train be moving in the direction indicated by the upper arrow, fig. 1, the connecting chain from the engine is attached to the hook B 1, and the force is communicated, not directly to the frame, but by means of the rods D D to the ends of the spring A 1, and from the spring to the carriage at the centre of the frame by means of the stop E, against which the middle of the spring rests; and to the succeeding carriage by the bar F, the hooks B 2, B 3, and the intermediate chain, to its spring A 2, as in the first, and so on through as many carriages as the train consists of. If, on the contrary, the force be applied at the other end (B 4), and the train be moving in the direction of the lower arrow, the power is communicated through the rod F to the middle of the spring A 2, and from thence to the after-end of the frame by means of the rods D D, and bar B 3, and to the succeeding carriage by the chain, and bar F, to the spring A 1, as before, and in like manner to each successive carriage in the train. The concussion consequent on the carriage running against any obstacle in front, or being itself struck from behind, is received by the spring through the buffer heads C C C C, the rods G G G, and the bent levers H H H, at one end of the frame; and by the buffer heads C 2, C 2, and the rods I I, at the other end.

This apparatus is complex, and consequently expensive; it also requires to be very strong, as on a little consideration it will be evident that the spring bars, levers and frame of the first carriage have to bear the resistance of the entire train; a very rigid spring is therefore necessary, the range of action of which is of course very limited (in practice not exceeding a few inches), consequently the concussions, although much diminished, are still very considerable. The apparatus being attached to the carriage frame, which is of course supported on bearing springs, it rises and falls according to the load; whence it constantly occurs, from the carriages being unequally weighted, that the buffer heads opposed to each other, and which by right should be at the same level, vary by nearly their own diameter. Whence, in the event of a violent blow, the bars to which they are fastened are almost certain either to be bent so as not to play in their sockets, whereby the whole apparatus becomes inoperative; or else to be broken off, (such we have found to be the case in every instance when an unusually severe blow took place). After the apparatus described was added to the Liverpool and Manchester carriages, it was found that the train no longer proceeded with a steady motion in the direction of the rails, but that each carriage had acquired a very considerable lateral motion, by which the flanges of the wheels were constantly striking or rubbing against the rails, so as to cause a considerably increased resistance from side friction; indeed, on looking along a train of six or eight carriages, the serpentine motion is very striking, thus ————————. The cause of this unsteady motion will be evident when we recollect that the point from which each carriage is drawn is in one direction, the centre, and in the other the after extremity. These considerations, the result of numerous careful examinations of the carriages on the Liverpool and Manchester Railway previous to ordering our own, led me to seek for a remedy, as on the Dublin and Kingstown Railway, so very large a proportion of the traffic of which would be passengers, the extent of which it would be difficult to anticipate, but which must of necessity be immense, it became a matter of paramount importance to attain, as far as practicable, the most perfect comfort and security, and also to reduce as much as possible the wear and tear of the numerous carriages which the company must provide. The apparatus which I designed, and which has been successfully applied to 35 of of our carriages, is represented in plan, section and elevation, in the accompanying drawings, figs. 2, 3, 4.

A slight frame of sheet iron, A A A, fig. 2, consisting of two similar plates, three inches apart, each about $\frac{3}{16}$ thick, secured together by rivets, rests on turned bearings on the centres of the axles; a single bar, B B (I have used a welded iron tube of $\frac{5}{16}$ inches thick and three inches diameter, as being the stiffest), the entire length of the carriage, and extending about two feet beyond each end, passing through an oblong hole three inches wide and nine inches long (H, fig. 2), is supported on this frame by rollers, C C C, allowing it to be moved lengthways with great facility; on this tube or bar B B B is placed at either end (within the framing of the carriage) about four feet of spiral springs, D D D, of graduated strengths; one end of each of these sets of springs rests against a strong collar or boss, E, fixed to the bar or tube, and the other end against a small box of iron, F, attached to the frame A, and furnished with one of the rollers C previously mentioned, also with the two friction rollers G & G projecting a little beyond its surface and resting against the inner side of the carriage frame end. To each extremity of the tube B B is attached a buffer head, I, by means of a bar of iron, K, passing through B B, and furnished with a nut and screw at each end; immediately within the buffer head, and resting against it, is a bar of iron, L, figs. 2, 3, for attaching the carriages together. It will be observed, that this apparatus lying loosely on the axles, is perfectly independent of the frame-work of the carriage, which is supported in the usual manner on bearing springs, M M, and, in consequence of the oblong holes H H, rises or falls according to the load without affecting the buffing apparatus. The action of the apparatus is as follows: The train being to be moved in the direction of the upper arrow figs. 2 & 3, the motive power is applied at L 1, and draws forward the central tube B B, thereby compressing the springs D D between the boss E and the friction roller-box F, which rests against the end of the carriage-frame, without moving this latter until the elastic force of the compressed springs becomes sufficient to overcome the resistance presented by the friction and inertia of the carriage, when the latter begins to move forward so gently as not to be perceptible to persons seated therein; the second and each succeeding carriage in the train is by similar means brought from a state of rest into motion, as (altogether independent of the springs D D) the tube B B acts on B 2 merely as a simple connecting chain, rope or bar would. In case of a concussion from behind, or of one carriage running against another, it will be at once seen that the resistance is offered by the furthest end, the effect being to drive the tube B B forward, compressing the springs at the remote end, and the carriage will not be affected by the blow until (as in drawing the train) the elasticity communicated to the springs overpowers the inertia of the carriage, which then begins to move, actuated by a force just sufficient to start it; any ordinary velocity might be thus (theoretically) resisted by sufficient length of spring, without any strain or violence to the carriage receiving the blow, but practically the springs are limited to about four feet, allowing a range of action of about two feet, beginning to be compressed by a force equal to about 20 pounds, and presenting a gross resistance to entire compression of upwards of two tons, and which have been found sufficient for all practical purposes. It will be observed, that as the springs of each carriage act totally independent of each other, and of all the carriages in the train, except that to which they are attached, each has but to bear its own share of the resistance, the sum of which is made up of the separate resistances of all the springs acted on: thus, if one set offers a resistance equal to two tons receding through two feet, and that there be 10 carriages in the train, the gross resistance to a concussion would be equal to 20 tons through two feet; and if the buffer heads of each carriage were in contact, as they should be, although (through error) not so represented in figs. 2 & 3, this great amount of resistance would be opposed without the carriages being necessarily moved forward, as in the case of any obstruction on the rails, or any of them bearing more than two tons. On the contrary, in the other apparatus, supposing each spring also to resist a force of two tons, and to recede, as is the case in practice, about eight inches, each spring being acted on by all that preceded it, the resistance offered by a train of 10 carriages would be but equal to two tons through 10 times the space each separate spring moved, or 10 × 8 = 80 inches, or six feet eight inches; consequently the first and each succeeding carriage would, to enable all the springs to act, be forced through a space equal to the sum of the spaces through which the separate springs act; thus the first carriage of the 10 would be forced through eight inches for each of the remaining nine carriages, or in all six feet, and it is easy to conceive the difference of the effect in the two cases. Experiments have been tried on this Railway, by placing a single carriage, fitted with the new apparatus, on the rails, and running an engine and tender against it with a velocity of six to seven miles an hour, without producing any injurious effect. I have more than once sat in a carriage so struck, without sustaining any injury or other effect greater than is felt on starting a train of carriages fitted with the old apparatus.

Another effect which has been realized by the adoption of this apparatus, is a perfectly steady forward motion in the trains, whereby very much of the side friction of the flanges of the wheels against the rails is avoided; and instead of that undulating lateral motion previously described, all the carriages constituting the train move forward in a steady path, as if they had not the power of motion independent of each other. Carriages are hereby rendered much less liable to go off the rails, and can be pushed before the engine in case of necessity with far greater confidence and less liability to accident; as although the impulse is given to the central bar from behind, yet it is obvious the carriage is acted upon from the front, precisely as it would be if drawn in the same direction. I have frequently, during our experimental trials before opening the Railway, propelled one and two carriages in this manner at a velocity of 30 miles per hour with perfect safety. The diminution of side friction necessarily diminishes the power requisite to draw a train: the amount of saving in this respect I have as yet been unable to ascertain experimentally with sufficient accuracy to state in this place; I have, however, ascertained that it is very considerable.

One other object, of no trifling importance to a concern like the Dublin and Kingstown Railway, which must have an exceedingly large stock of carriages, is also effected; namely, a diminution of first cost of between 50*l.* and 60*l.* per carriage.

In describing figs. 2 & 3, I omitted to state that as the entire resistance to the action of the springs D D is on the ends of the carriage-frame, the centre of each is armed with a strong plate of iron, about 15 inches square, through which pass the tension rods N N to the outer angles of the opposite ends of the frame; consequently these rods receive the entire force of the springs.

(signed) *T. F. Bergin.*

Gentlemen, Dublin, 16 January 1835.

In December last I examined the Works of the Drogheda Harbour, and was extremely gratified to find so much done.

The first object with regard to the improvement of the harbour of Drogheda has been to remove all the bars of shingle and gravel which were and are to be found in the channel, thereby increasing the depth of water for ships of a larger class; secondly, by deepening and widening the channel, to let a greater volume of sea water flow up, by which means a greater scouring power would be obtained, and the estuary of the Boyne to be entirely kept free and exempt from any kind of embankment whatsoever. The destruction of several harbours in Great Britain having been occasioned by embanking out the sea, and thereby weakening the scouring power outwards, is sufficient warning not to attempt anything of the kind at the harbour of Drogheda.

By deepening and widening the channel, not only will there be a greater flow of water in, but high-water will take place sooner at the quay than formerly, and ships will come sooner up, which has already been found to be the case arising from the works already done, by the ship captains navigating the channel. The low small parallel rubble-stone dykes are for the purpose of equalizing the velocity of the water, and keeping the main run in the channel, thereby tending to keep the bottom clean and clear from deposits of any kind. I have proposed to cut away a part of the point between the New Deep and the Swash, and which may be done successively as represented in the chart; and the same at the Carrick. These improvements can be very readily effected without at all touching or changing the present navigation; and the channel, I will then venture to say, will be more straight, safe and easy, and will possess a greater radius of curvature at the turns, than has yet been proposed by any plan of improvement that I have yet seen or heard of for Drogheda Harbour.

Progress of the Works.

On the north side of the channel 3,040 feet long of parallel walls have been made; and on the south side, 5,520 feet. These walls consist of rubble stone laid down as represented in the accompanying chart, by red lines along the river navigation; the tides always flow over these walls.

In 1833 the stream dredge took up 77,140 tons of gravel from the bed of the channel, and in 1834, 94,900 tons, making a total of 172,040. There has been taken from the quarry 9,622 cubic yards of top bearing, and a loading pier has been built consisting of 250 cubic yards of masonry; and a small railway has been laid down, extending from the quay to the pier.

There has been quarried 22,147 tons of stones for making the parallel walls along the sides of the channel. By referring to the Table, the quantity of shingle and gravel taken up by the steam dredging vessel can be seen at each respective place.

Originally the bank of gravel and small stones, called the Rough Ground, was extremely detrimental to the ship navigation; the deepest part over it being not more than three feet, and in many places not more than one foot at low-water. This bar has been cleared away to a depth of five feet, and 45 yards wide.

Tickel's Bed has been cleared away nearly in a like manner.

At the end of the Carrick the navigation was barred across by a ridge of heavy gravel, which has been cut away to a depth of three feet; but this cut is narrow, and will require another summer's work to widen it to a sufficient breadth.

At the point opposite to the New Deep the channel has been very much improved, having been widened 30 yards, and deepened to nearly seven feet at low-water. From this point up to the bridge, the bed of the channel of navigation has been generally cleared of any banks that had accumulated.

In the channel opposite the quay wall, 29,000 tons of gravel have been taken up. During fine weather the steam dredge generally works outside the North and South Crook, and during the periods of stormy weather she works inside the Crook.

The advantages already derived from the operations carried on for improving Drogheda Harbour during the last two seasons are such that, before that time, vessels drawing only 11 and 12 feet water could not sail up to the quay with a full cargo except at high spring tides; vessels now drawing 11 and 12 feet of water sail up to the quays with a full cargo at high-water lowest neap tides. Last summer a vessel of 400 tons burthen, and drawing 14 feet water, sailed up the whole channel, from the bar to the quay, and discharged her cargo.

There

There are at present four fine steam vessels of the first class which sail regularly to Liverpool with cattle, &c.; and the merchants of Drogheda have commenced a trade with Glasgow by steam navigation. The first vessel that landed a cargo of cattle at the Broomielaw was the steamer belonging to Drogheda, called the Green Isle.

There is a fifth steamer now building for the port of Drogheda, and several vessels of 400 tons burthen are now building also for Drogheda, intended for the North American trade. The port is therefore greatly increasing in its trade and commerce.

Accompanying this Report is a general chart of the Boyne River, showing the channel of navigation from the bridge to the bar; 2d, a general longitudinal section of the bed of the channel; 3d, a sheet containing three transverse sections of the bed of the channel. The town of Drogheda has been sketched in from a trace obtained from the general survey of Ireland. The chart and longitudinal section were reduced from a survey made by Mr. John Mac Neil, for the late Mr. Nimmo.

I have the honour to be, gentlemen,
Your most obedient humble servant,
(signed) *William Bald.*

To the Commissioners for improving
the Port of Drogheda.

The steady unremitting care and attention bestowed on the Harbour Works by Mr. John Young, the resident engineer, have met with my entire approbation; and I therefore venture to take the liberty to recommend him to the consideration of the Commissioners for improving the Port of Drogheda.

(signed) *William Bald.*

Remarks on the Construction of Bog Roads.

Below Lough-a-veun there is a soft, deep and extremely wet Bog, and over it the Antrim Coast Road passes.

With regard to the making of Roads over Bogs, it may perhaps be necessary to offer a few observations, as Roads require to be made frequently over them in many parts of Ireland, Bogs occupying nearly one-fifth of her surface.

In making Roads over soft wet Bogs, the first operation has been to make double drains on both sides of them, as represented in the tranverse section B, and then to tap off, by small drains into the main ones, all the small pools of water which may be on the surface of the Bog between the drains, and also adjacent to them; thus, in the first instance, freeing the whole face of the Bog which is destined for the floor of the Road from stagnant surface water.

The drains in deep soft Bogs can only be sunk to a proper depth by continuous operations during successive seasons; and this will be best done in the summer months, when the weather would be dry, and deepening them gradually, as represented in the transverse sections of drains C, D.

After the Bog has been well drained, the whole surface of the Road should be brought to a fair level, by filling up and covering all surface irregularities with firm heathy sods, taken from a dry heathy bog surface, cut evenly and parallel on the sides, and square at the ends. In all fillings, the heathy sides of the first course of bog sods should be placed downwards; and when the whole surface for the Road has been brought to an even level, regular courses of heathy sods should be laid on over the whole breadth, from fence to fence, fair and regular, as described in the transverse section A, closely set together, and breaking joints with the under course of sods. In all trunking or embanking over Bogs with heathy sods, the top surface should always finish with the heathy sides upwards, and with a convexity, as shown in the transverse sections A and B. In many cases it will be necessary to lay three courses of bog sods, even after the surface of the Bog has been made level; and in some cases even four and five will be required to make a solid and firm vegetable embankment fit to carry the road materials. And to effect this part of the work in a perfect and substantial manner, will give great durability to the Road; but if imperfectly executed, it will be an utter waste of materials and labour to attempt to make anything like a good or a permanent Road; because the Road will sink below the level of the Bog's surface, get out of shape, and be subject, in many instances, to be covered with water during the rainy periods of the year.

The Road should be first finished as to level and shape, before any fences be made.

Over the embankment or trunking will be spread a coating, of four inches deep, of mixed earthy and gravelly matter, which will be set into a firm mass, over which, when properly consolidated, will be laid the broken stone or prepared clean gravel, as in ordinary cases.

(signed) *William Bald.*

HARBOUR WORKS of *Ballyshannon*, in the County of *Donegal*, now in progress under the direction of Robert Stephenson & Son, of Edinburgh, Civil Engineers.—9 Dec. 1834.

ALTHOUGH the trade of Ballyshannon is not in itself sufficient to have called forth much exertion for the improvement of its Harbour, yet the localities of that port, as connected with the extensive inland navigation of Lough Erne, render any improvement of its access an object of much importance to an immense district of country, including parts of Donegal, Tyrone, Monaghan and Cavan, and the whole county of Fermanagh; and it has been contemplated, as an ultimate result of improving the entrance to the River Erne, that a communication might be formed between Belturbet, at the southern extremity of Lough Erne, and the Royal Canal to Dublin.

Ballyshannon is situated on the River Erne, about 2½ miles from its mouth, and at the distance of four miles from its junction with the Lough of that name. The improvement of the navigation between the sea and the Lough has long been regarded as an object of national importance, in so much so, that in the year 1789 Government granted a sum of money toward the formation of a navigable canal; but the nature of the ground and the level of Lough Erne, which is 138 feet above the sea, at high water of a 10-feet tide, rendered the attempt almost impracticable; and the scheme was abandoned, after it had been commenced near Beleek. Seaward of the town, however, the only obstruction to the navigation of the river, even by the larger classes of merchant vessels, is the bar. To deepen the outer bar, and especially the inner shallow, called the Patch, may therefore be regarded as an object of primary importance, which ought justly to take precedence of all Works for the improvement of the landward communication; and Messrs. Stephenson, of Edinburgh, the engineers who are directing the Works at Ballyshannon, recommended that the operations should be strictly confined, in the first instance, to the deepening of the bar and excavation of the rocks composing the Patch, upon the success of which undertakings they considered that every ulterior work for forming inland communications ought to be entirely contingent. The estimate for deepening the bar is 5,561 *l.* 2 *s.* Before the commencement of the Works, at low water of spring tides there was only a depth of 2½ feet upon the Patch, as will be seen from the accompanying Plan; and at high water, of the same tides, this shallow was covered to the depth of 12½ feet. It is intended, as the main object of the Works proposed by the engineers, to increase this depth, so as to render the port accessible to merchant ships of 300 or 400 tons; a class of vessels well adapted for the timber trade on this coast.

The operation which has been undertaken for the attainment of these desirable objects is chiefly excavation under water, and was commenced about last Midsummer; but the works are now stopped for the winter months. It will be seen from the accompanying Plan and Section, that the mouth of the river, where it is coloured red, has, in the course of that time, been deepened half across, to a level varying from one to three feet below its former bed, as shown by the several sectional lines; and it is expected that the depth of three feet will be carried right across the river in the course of next season, thereby affording a depth of about 14½ feet at high water of spring tides. The stream, which is now distorted from its natural course by the present state of the operations, will then flow seaward in an uniform current.

The implements employed in this work are simple in their construction, and consist chiefly of grappling irons, and a crane set upon a great barge or lighter, which is also provided with crab or winch machines, mooring chains and anchors. There are besides smaller barges and other apparatus of various kinds. A work-yard has also been inclosed near the scene of operations, and a house for the superintendent; and workshops have been built, which are intended to be converted into a station for those pilots and fishermen who may afterwards attend the shipping frequenting the port. The expenditure, during the last season, has not yet been fully made up, but may be stated to be under 1,200 *l.* During the ensuing season, however, a greater outlay will be required, as it is intended at spring tides to carry on the work by night as well as by day; the greatest tides on this coast happening about mid-day and mid-night.

Though the operations have been conducted on a very moderate scale, it has been thought advisable in a work of this kind, where much depends upon the individual exertions of those employed, to excite some desire for the success of the work, by connecting it with their personal interests; and the inspector, besides his annual salary of 120 *l.* per annum, has a premium for each foot of depth which he acquires across the entire bed of the river. The extent of the work done is ascertained on reference to fixed levels, determined by the engineers, and compared by sounding the depths; and this season the inspector has been found entitled to a premium of 30 guineas. It has also been proposed, next season, especially in the view of its being necessary to work by night, to give the labourers, besides their stated wages, a premium in the name of tonnage on each ton of stuff actually lifted and discharged from the lighters, which shall be equally divided among the regular labourers at the end of the season, on the report of the inspector.

In their annual report of progress for the past season, Messrs. Stephenson recommend the planting of bent grass (agrostis, Lin.) on the sand-hills at the entrance of the River Erne, to check the sand-drift, which is frequently deposited in the river in great quantities, so as to be highly injurious to the navigation. A very successful experiment of this kind has been made at Lord Palmerston's estate of Mullaghmore (the harbour of which is now under survey), over an extent of some hundred acres, by Mr. Lynch, his Lordship's agent, who recommends the use of a kind of dibble, like that for planting trees. The engineers also

allude

allude to the planting a species of fir (pinus maritima major), which has been resorted to with great success to stop the progress of shifting sand, in the district of Grave, at the mouth of the Garonne, and along a great extent of the shores of the Bay of Biscay. This experiment was first made at the suggestion of the late M. Bremonteuil, Ingenieur des Ponts et Chaussées; and the engineers consider this system of great national importance, as applicable to many parts of the coast of the United Kingdom.

These exertions for the improvement of Ballyshannon Harbour, and the communication with Lough Erne, owe their origin to the public spirit of the gentlemen of Ballyshannon and the neighbouring counties; but the works now in progress for improving the entrance to the River Erne, estimated at 5,561 *l.* 2 *s.*, have been undertaken chiefly through the munificence of Colonel Conolly, Member of Parliament for Donegal. That this object is well worthy of exciting a favourable interest cannot be doubted by those who consider the suitable position of Ballyshannon for connecting Lough Erne with the sea, by means of a road or railway communication, as proposed by Messrs. Stephenson. The extent to which this inland communication may ultimately be carried has already been hinted at; while the command of water-power in the immediate district of the River Erne, is not perhaps surpassed in any part of the kingdom. These advantages, however, must lie completely dormant so long as the communication with the sea is attended with so much hazard and uncertainty, and is limited to so small a class of vessels; and we cannot but hail the result of the operations at Ballyshannon, during the past year, as the harbinger of much good to the north-western district of Ireland.

ABSTRACT of the Accounts of the Commissioners of Public Works, *Ireland*, showing the Totals of Sums entrusted to their management for Collection or Disbursement, as well those under the Provisions of the Act 1 & 2 Will IV, and other Acts; viz Loans out of Consolidated Fund by the late Commissioners, Loans by Exchequer Bills, Grants, Salaries and Incidents of Office, Inland Navigation, Fisheries, Roads and Bridges Turnpike Roads under Contract, Post Roads, and Roads and Bridges, Grant for Western District, as also for Services committed to their charge by the Lord Lieutenant's authority, viz Phoenix Park and Dublin Buildings, Kingstown Harbour, and Dunmore Harbour, one year ended 31st December 1834.

No. of Account	—	COLLECTED for Account of the Teller of Exchequer £	s.	d.	BALANCES from last Account. £	s.	d.	RECEIVED. £	s.	d.	TOTALS. £	s.	d.
1.	Loans (late Consolidated Fund) - - -	21,242	14	3	-	-	-	-	-	-	21,242	14	3
2	Loans by Exchequer Bills	-	-	-	290	2	3	13,942	6	8	14,232	8	11
3.	Grants - - - -	-	-	-	1,405	12	2	31,461	19	9	32,867	11	11
4.	Salaries and Incidents of Office - - -	-	-	-	1,255	17	–	4,813	2	2	6,068	19	2
5.	Inland Navigation -	-	-	-	1,018	3	7	2,436	2	2	3,454	5	9
6.	Fisheries - - -	-	-	-	18,129	17	5	1,500	–	–	19,629	17	5
7	Roads and Bridges -	-	-	-	305	3	10	9,505	14	6	9,810	18	4
8	Turnpike Roads under Contract - -	-	-	-	-	-	-	1,837	2	4	1,837	2	4
9.	Post Roads - -	-	-	-	-	-	-	1,000	–	–	1,000	–	–
10	Grant of 1834 for Western District - -	-	-	-	-	-	-	2,000	–	–	2,000	–	–
11	Phoenix Park and Dublin Buildings - -	-	-	-	1,394	9	9	17,641	15	–	19,036	4	9
12.	Kingstown Harbour -	-	-	-	-	-	-	16,484	2	7	16,484	2	7
13	Dunmore Harbour -	-	-	-	2,504	9	7	3,000	–	–	5,504	9	7
	£.	21,242	14	3	26,303	15	7	105,622	5	2	153,168	15	–

No. of Account	—	PAYMENTS into the Exchequer. £	s.	d.	EXPENDED. £	s.	d.	BALANCES. £	s.	d.	TOTALS. £	s.	d.
1.	Loans (Consolidated Fund) - - -	21,242	14	3	-	-	-	-	-	-	21,242	14	3
2	Loans, Exchequer Bills	11,000	–	–	-	-	-	3,232	8	11	14,232	8	11
3	Grants - - -	-	-	-	26,183	5	7	6,684	6	4	32,867	11	11
4.	Salaries and Incidents -	-	-	-	4,515	6	3	1,553	12	11	6,068	19	2
5	Inland Navigation -	-	-	-	1,722	14	3	1,731	11	6	3,454	5	9
6	Fisheries - - -	-	-	-	6,121	4	10	13,508	12	7	19,629	17	5
7	Roads and Bridges -	-	-	-	8,691	18	3	1,119	2	1	9,810	18	4
8.	Turnpike Roads under Contract - -	-	-	-	1,837	2	4	-	-	-	1,837	2	4
9	Post Roads - -	-	-	-	-	-	-	1,000	–	–	1,000	–	–
10	Grant of 1834 for Western District - -	-	-	-	622	14	1	1,377	5	11	2,000	–	–
11.	Phoenix Park and Dublin Buildings - -	-	-	-	17,977	3	4	1,059	1	5	19,036	4	9
12.	Kingstown Harbour -	-	-	-	12,524	10	10	3,959	11	9	16,484	2	7
13	Dunmore Harbour -	-	-	-	2,782	1	6	2,722	8	1	5,504	9	7
	£.	32,242	14	3	82,977	19	3	37,948	1	6	153,168	15	–

No 1.—A STATEMENT of the several LOANS made by the Late COMMISSIONERS for the issue of LOANS out of the CONSOLIDATED FUND in *Ireland*, pursuant to Provisions of the 57 Geo 3, c 34, and subsequent Acts, showing the Amount of PRINCIPAL and INTEREST appearing due upon each on 1st January 1834, (and the Interest since accrued), the REPAYMENTS made on account thereof, and the BALANCES outstanding on 31st December 1834.—By the Commissioners for the Extension and Promotion of Public Works in Ireland.

No. of Loan.	PARTIES.	OBJECT.	BALANCES due on 1st January 1834.		Interest accrued in Year ended 31st Dec 1834.	TOTAL.	REPAYMENTS.		BALANCES outstanding on 31st December 1834	
			Principal.	Interest.			Principal.	Interest.	Principal	Interest.
			£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d
102	Marquis Sligo and Rt Hon D. Browne.	Completing pier at Old Head, county Mayo	292 10 –	12 4 8	8 18 2	313 12 10	- - -	- - -	292 10 –	21 2 10
3	Jocelyn H Thomas -	To improve a fishery, co. Wexford	184 12 3	– 13 1	9 19 –	194 4 4	46 3 1	9 15 5	138 9 2	– 16 8
4	Commissioners of the -	Navan turnpike road - -	4,033 6 1	2,883 2 5	295 19 11	8,092 8 5	- - -	- - -	4,033 6 1	3,159 2 4
24	- - ditto - - -	- - - ditto - - - -	1,288 14 10	686 15 –	64 19 3	2,038 9 1	- - -	- - -	1,288 14 10	751 14 3
53	- - ditto - - -	- - - ditto - - - -	923 1 7	471 10 5	46 3 1	1,440 15 1	- - -	- - -	923 1 7	517 13 6
5	Wexford Corporation -	To improve the harbour - -	151 4 11	8 0 10	- - -	159 7 9	151 4 11	8 0 10	—	—
8	Portumna ditto - -	For a bridge across the Shannon	2,769 4 8	1,326 8 11	166 3 –	4,261 16 7	- - -	- - -	2,769 4 8	1,492 11 11
9	N. P. Leader - - -	To work a colliery, county Cork	2,307 13 1	12 7 10	92 5 11	2,412 8 10	- - -	- - -	2,307 13 1	104 13 9
107	- - ditto - - -	- - - ditto - - - -	6,500 – –	34 18 1	260 – –	6,794 18 1	- - -	- - -	6,500 – –	294 18 1
12	G. Lambart & B. Magrore	Repairs of Kilbeggan church -	232 6 2	230 6 1	16 12 4	479 4 7	- - -	- - -	232 6 2	246 18 5
13 & 28	Cork Wide street Commissioners - - -	To improve the city - - -	6,700 – –	1,250 3 6	268 – –	8,218 3 6	- - -	- - -	6,700 – –	1,518 3 6
113	- - ditto - - -	Further for same - - -	7,000 – –	2,198 15 3	350 – –	9,548 15 3	- - -	- - -	7,000 – –	2,548 15 3
14	Hovendon Stapleton -	To work a colliery - - -	963 10 11	68 1 8	44 15 5	1,076 8 –	93 14 5	81 5 7	869 16 6	31 11 8
18	Mayo county Grand Jury	For the road into Erris - -	1,513 7 9	64 13 7	59 11 5	1,637 12 9	383 18 8	76 18 2	1,129 9 1	47 6 10
40	- - ditto - - -	Court-house, Castlebar - -	987 3 3	42 3 9	44 – 1	1,073 7 1	127 11 6	50 3 3	859 11 9	36 – 7
52	- - ditto - - -	Court house, Ballinrobe - -	220 1 1	9 8 1	9 15 8	239 4 8	29 3 11	11 3 7	190 17 2	8 – –
15	Owen M'Carthy - -	To work a colliery - -	1,181 3 5	14 17 8	59 1 2	1,255 2 1	- - -	- - -	1,181 3 5	73 18 8
27	Kerry county Grand Jury	Road into Iveragh - -	1,212 9 3	10 6 5	56 5 10	1,279 1 6	211 2 3	58 15 11	1,001 7 –	7 16 4
34	- - ditto - - -	Same purpose - - - -	363 10 7	3 2 –	15 16 11	382 9 6	110 5 2	18 19 6	253 5 5	1 19 5
37	- - ditto - - -	Road, Kenmare to Killarney -	1,675 1 7	15 18 1	72 1 5	1,763 1 1	556 11 2	79 4 11	1,118 10 5	8 14 7
51	- - ditto - - -	Road, Dingle to ditto, and Tralee	1,322 – 10	11 8 1	51 4 6	1,384 10 5	221 18 1	63 17 –	1,100 2 9	8 11 9
58	- - ditto - - -	Bridge at Listowel - - -	686 17 9	20 4 1	14 3 7	721 5 5	169 6 11	32 8 11	517 10 10	4 – 9
71	- - ditto - - -	Road over Connor Hill - -	497 16 1	4 4 9	23 – 9	525 1 7	85 18 –	24 1 4	411 18 1	3 4 2
35	Kilkenny co. Grand Jury	Road, Callan to Johnstown -	173 – 1	2 2 7	7 18 5	183 1 1	30 – 5	8 19 –	140 19 8	1 2 –
43	- - ditto - - -	Causeway, at Thomastown -	180 13 4	8 16 4	9 – 8	198 10 4	- - -	- - -	180 13 4	17 17 –
57	- - ditto - - -	Bridewell - - ditto - -	367 16 5	13 13 1	15 13 10	397 3 4	111 3 1	27 9 9	256 14 1	2 – –
92	- - ditto - - -	Road, Castlecomer to Ballinakill -	1,222 2 11	23 5 5	59 9 8	1,304 18 –	86 17 3	73 17 9	1,135 5 8	8 17 4
97	- - ditto - - -	Road, Kilkenny to Carrick-on-Suir	1,029 0 4	38 4 –	45 7 11	1,110 14 3	195 13 5	77 1 10	833 8 11	6 10 1
114	- - ditto - - -	Road, Castlecomer to Timahoe -	252 – 7	4 16 11	12 4 4	269 – 10	21 16 11	15 3 1	230 3 8	1 17 2
122	- - ditto - - -	Road, same to Carrick-on-Suir -	274 19 6	4 15 1	12 10 8	292 14 3	19 1 1	15 14 11	255 18 4	1 19 11
33	Queen's co. Grand Jury -	Road from Abbeyleix to Loughlin Bridge	148 18 1	3 2 10	5 6 2	157 7 1	76 – 9	7 – 11	72 17 4	1 8 1

No. 1.—Statement of Loans issued out of late Consolidated Fund—*continued*.

No. of Loan.	PARTIES.	OBJECT	BALANCES due on 1st January 1834. Principal. £. s. d.	BALANCES due on 1st January 1834. Interest. £. s. d.	Interest accrued in Year ended 31st Dec. 1834. £. s. d.	TOTAL. £. s. d.	REPAYMENTS. Principal. £. s. d.	REPAYMENTS. Interest. £. s. d.	BALANCES outstanding 31st December 1834. Principal. £. s. d.	BALANCES outstanding 31st December 1834. Interest. £. s. d.
119	Queen's co. Grand Jury -	Sessions houses, Stradbally, and Borris in Ossory	1,703 3 6	35 18 7	79 7 2	1,818 9 3	313 9 9	86 10 3	1,489 13 9	28 15 6
36	Cork co. Grand Jury -	Road, Bantry to Castletown -	514 2 1	5 7 –	22 4 8	541 13 9	169 1 2	24 18 10	345 – 11	3 12 10
38	- - ditto - -	Ditto, bridges on same - -	762 12 4	7 18 9	34 6 6	804 17 7	216 11 8	38 1 6	546 – 8	4 3 2
74 & 80	- - ditto -	Seven sessions-houses - -	3,403 18 7	35 8 9	157 – 11	3,596 8 3	664 15 5	171 9 5	2,739 3 2	21 – 3
39	Cavan county ditto -	Court-house at Cavan - -	1,288 15 3	29 11 4	40 13 6	1,361 – 1	761 18 3	68 17 1	526 17 –	3 7 9
42	Waterford co. ditto -	Road, Cork to Dungarvan - -	153 12 7	- - -	7 3 2	160 15 9	55 3 4	7 3 2	98 9 3	—
50	- - ditto - - -	Road and gaol, Waterford -	616 2 11	10 12 8	27 10 5	654 6 –	150 7 1	34 5 3	465 15 10	3 17 10
62	- - ditto - - -	Road, Kilmacthomas to Fethard -	300 16 2	5 3 10	14 – 8	320 – 8	46 3 –	17 2 –	254 13 2	2 2 6
88	- - ditto - -	Court house, Dungarvan - -	632 10 5	10 18 4	29 – –	672 8 9	120 10 10	35 12 10	511 19 7	4 5 6
115	- - ditto - - -	Roads Dungarvan, Cork, Youghall, &c.	8,923 17 3	154 – 5	425 1 11	9,502 19 9	978 5 10	512 14 6	7,945 11 5	68 7 10
45 & 105	Grand Canal Directors	Ballinasloe Extension and Bridge	46,454 3 –	12,582 19 6	1,850 3 3	60,887 5 9	- - -	601 3 10	46,454 3 –	13,831 18 11
90	- - ditto - - -	Mountmellick Branch - -	33,416 6 1	8,109 10 1	1,336 13 –	42,862 9 2	- - -	342 1 –	33,416 6 1	9,104 2 1
135	- - ditto - - -	Ballycommon to Kilbeggan, ditto	18,000 – –	2,258 7 11	720 – –	20,978 7 11	- - -	- - -	18,000 – –	2,978 7 11
46	Right Hon. D. Browne and others.	Pier at Bunderan, county Mayo	138 9 4	– 12 1	6 18 5	145 19 10	- - -	- - -	138 9 4	7 10 6
47	Rev. E. T. Conyers -	Knockane church repairs - -	6 13 8	– 3 6	– 2 10	7 – –	6 13 8	– 6 4	—	—
48	Lord Bantry & M. Murphy	To employ the poor of Bantry -	1,246 3 1	106 9 2	62 6 1	1,414 18 4	- - -	100 – –	1,246 3 1	68 15 3
49	Galway town Grand Jury -	Court house at Galway - -	1,277 18 4	44 2 3	59 15 10	1,381 16 5	181 8 1	95 9 11	1,096 10 3	8 8 2
87	- - ditto - - -	Portico to ditto - - -	399 15 3	13 16 –	19 9 4	433 – 7	24 17 2	30 7 10	374 18 1	2 17 6
54	Wicklow county ditto -	Road, Wicklow to Arklow -	1,117 7 6	30 3 1	47 4 2	1,194 14 9	307 8 11	62 10 1	809 18 7	14 17 2
72	- - ditto - - -	Road, Dublin to Rathdrum -	719 19 1	19 8 7	28 1 4	767 9 –	277 17 7	39 4 7	442 1 6	8 5 4
130	- - ditto - - -	Road, Wicklow to Naas - -	646 11 4	17 8 11	12 9 –	676 9 3	646 11 4	29 17 11	—	—
55	Leitrim county ditto -	Road, Bundoran to Manorhamilton	1,249 19 5	6 6 –	40 10 –	1,296 15 5	464 19 5	46 7 5	785 – –	– 8 7
104	- - ditto - - -	Road, same to Drumsna - -	2,249 3 8	14 3 5	101 14 10	2,365 1 11	396 3 1	114 14 2	1,853 – 7	1 4 1
125	- - ditto - - -	Road, Ballinamore to Granard -	764 6 2	8 16 2	30 16 10	803 19 2	124 11 –	39 4 3	639 15 2	– 8 9
128	- - ditto - - -	Road, Drumsna to Bundorne -	1,080 4 11	6 16 1	49 14 5	1,136 15 5	156 8 1	55 17 11	923 16 10	– 12 7
129	- - ditto - - -	Road, Manorhamilton to Enniskillen	1,279 9 11	8 1 2	58 9 8	1,346 – 9	189 14 9	65 15 11	1,089 15 2	– 14 11
56	Armagh co. Grand Jury -	Road, Newtownhamilton to Dundalk	302 12 8	1 18 1	13 11 11	318 2 8	78 3 –	14 3 –	224 9 8	1 7 –
61	Limerick Bridge Commissioners	Road, Wellesley Bridge & Docks	55,384 12 4	7,545 11 10	2,215 7 8	65,145 11 10	- - -	- - -	55,384 12 4	9,760 19 6
63	Limerick co. Grand Jury	Road to Tarbert - - -	1,065 19 5	36 6 3	45 1 4	1,147 7 –	440 11 6	80 1 9	625 7 11	1 5 10
66	Drogheda town - ditto -	Road, Colton to the Sea - -	58 14 1	– 8 –	2 9 7	62 11 8	19 2 8	2 – 4	39 11 5	– 17 3
67	Cork city - ditto -	Road, the Great Western - -	2,119 4 11	32 5 7	74 11 10	2,226 2 4	689 8 5	75 9 11	1,436 6 8	24 17 4
98	- ditto - - - -	For improvements in city -	2,852 15 8	43 9 1	125 9 9	3,021 14 6	384 9 10	105 11 4	2,478 – 8	53 12 8

64	Rev. H. Pasley and others	Repairs, Ballyhome church	253 1 7	102 16 7	10 16 5	376 2 7	- - -	-	263 1 7	113 1 –
69	Roscommon co. Grand Jury	Court-house, Roscommon - -	1,757 18 9	46 9 1	75 4 7	1,873 12 5	440 17 8	90 1 4	1,317 1 1	25 12 4
84	- - - ditto - -	Road, Drumna to Bundoran	1,320 11 4	46 18 9	58 1 9	1,425 11 10	481 14 9	84 16 5	1,038 16 7	20 4 1
109	- - - ditto - -	Court-house, Boyle - - -	351 8 6	3 1 9	15 16 –	375 6 3	61 14 11	18 5 1	289 13 7	5 12 8
120	- - - ditto - -	Court-house, Strokestown - -	592 12 –	12 – 6	24 13 1	559 5 7	52 8 3	27 10 9	470 2 9	9 2 10
134	- - - ditto - -	Bridewell - - ditto - -	277 18 11	6 7 11	13 – 8	297 7 6	30 7 8	14 12 4	247 11 3	4 16 3
70	R. H. Maunsell - -	Plassy Canal, county Limerick -	1,053 6 1	103 4 6	37 17 4	1,194 7 11	140 6 3	113 7 7	912 19 10	27 14 3
73	Donegal co. Grand Jury -	Road, Donegal to Greencastle -	158 6 7	– 16 5	7 – 11	166 3 11	43 19 10	7 – 5	114 6 9	– 16 11
81	- - - ditto - -	Bridges on same - - -	208 15 5	1 1 8	9 13 4	219 10 5	37 17 5	9 9 9	170 18 –	1 5 3
82	Westmeath - ditto -	Court-house, Mullingar - -	1,141 14 11	9 7 8	46 3 7	1,197 6 2	527 1 6	59 10 4	614 13 5	5 – 11
126	Fermanagh - ditto -	Road, Enniskillen to Swanlinbar	120 8 7	3 14 4	6 2 5	132 5 4	- - -	- - -	122 8 7	9 16 9
86	Dundalk Road Trustees -	Road to Banbridge - - -	1,805 – 9	108 1 –	84 19 3	1,998 1 –	237 9 4	188 1 7	1,567 11 5	4 18 8
89	Wexford co. Grand Jury -	Road, Carnew to Wexford - -	791 5 11	17 4 8	36 7 4	844 17 11	108 14 2	39 7 10	682 11 9	14 4 2
108	- - - ditto - -	Court-house and Bridewell, Ross	1,042 3 9	21 5 3	48 14 8	1,093 3 8	82 – 5	51 8 5	840 3 4	19 11 6
131	- - - ditto - -	Road, Wexford to Duncannon Fort	2,764 7 1	60 4 2	130 11 4	2,955 2 7	263 10 5	138 14 3	2,500 16 8	52 1 3
91	Magheraculmoney Church-wardens - -	Repairs of church - - -	104 4 3	– 13 8	5 4 2	110 2 1	- - -	- - -	104 4 3	5 17 10
94	Carlow co. Grand Jury -	Court house, Tullow - - -	325 14 4	7 6 3	14 17 5	347 18 –	53 5 3	16 17 9	272 9 1	5 5 11
95	Tyrone co. - ditto -	Road, Castlederg to Donegal -	115 10 2	2 10 11	– 19 11	119 1 –	115 10 2	3 10 10	—	—
110	- - - ditto - -	Court-house, Dungannon - -	594 – 7	13 2 –	25 8 2	632 10 2	199 10 8	34 17 10	394 9 11	3 12 4
116	- - - ditto - -	Road, Strabane to Lifford - -	1,206 7 7	27 8 8	47 17 3	1,281 13 6	572 4 4	69 9 7	634 3 3	5 16 4
127	- - - ditto - -	Road, Dromore to Omagh - -	17 10 10	– 7 3	– 3 –	18 1 6	17 10 10	– 10 8	—	—
132	- - - ditto - -	Road, Fintona to Dromore -	509 15 3	11 11 10	17 18 5	539 5 6	326 5 –	27 16 7	183 10 3	1 13 8
133	- - - ditto - -	Road, Fintona to Fivemiletown -	1,403 9 10	30 19 1	52 – 5	1,486 9 4	788 12 6	77 8 8	614 17 4	5 12 10
138	- - - ditto - -	Road, Omagh to Cookstown -	1,882 10 1	65 16 2	90 15 9	2,039 1 –	164 18 5	151 11 10	1,727 11 8	2 19 1
96	N. D. Crommelin - -	To improve an estate co. Antrim	10,000 – –	3,021 2 6	400 – –	13,421 2 2	- - -	- - -	10,000 – –	3,421 2 2
137	- - ditto - - -	Road from Ballymoney to the sea	1,967 16 3	355 17 11	78 14 3	2,402 8 5	- - -	- - -	1,967 16 3	434 12 2
106	Athluckard Commissioners	For bridge across the Shannon -	6,000 – –	1,446 13 7	240 – –	7,686 13 7	- - -	- - -	6,000 – –	1,686 13 7
111	Sligo county Grand Jury	Road, Sligo to Derry - -	1,453 1 1	34 17 5	47 12 8	1,545 11 2	962 11 8	70 17 –	500 9 5	11 13 1
112	Waterford city - ditto -	Road, Waterford to Cork - -	404 13 11	3 10 11	16 6 10	424 11 8	188 12 4	18 1 8	216 1 7	1 16 1
121	Londonderry city ditto -	Road, Magherafelt to Derry -	327 10 11	8 14 7	13 9 5	347 14 11	97 2 3	15 8 9	230 8 8	4 15 3
123	Limerick city - ditto -	Road, Limerick to Tarbert -	173 15 8	5 11 10	8 10 2	187 17 8	14 17 7	13 8 7	158 18 1	– 13 5
124	Clare county - ditto -	Roads, sundry, Ennis to Ballinaslee, &c. - - - -	75 17 9	1 17 10	- - -	77 15 7	75 17 9	1 17 10	—	—
136	- - - ditto - -	Bridges on same - - -	1 9 5	– – 9	- - -	1 10 2	1 9 5	– – 9	—	—
139	Youghall Commissioners -	For a bridge over Blackwater -	10,000 –	1,168 8 7	400 – –	11,568 8 7	- - -	- - -	10,000 – –	1,568 8 7
		£.	287,617 18 3	47,389 9 10	11,099 15 6	347,007 3 7	16,271 17 7	4,970 16 8	271,362 6 5	54,402 2 11

No. 2.—THE ACCOUNT of the COMMISSIONERS of PUBLIC WORKS, *Ireland*, of all SUMS received in Repayment on Account of LOANS, made under 1 & 2 Will. IV. c. 33, for One Year; ended 31 December 1834.

RECEIPT:	£.	s.	d.
To Balance in Bank, as per last Account - - - - - - -	290	2	3
Repayments on account of Principal and Interest due on sundry Loans, as per detailed Statement, (pages 12 to 16) - - - -	13,942	6	8
£.	14,232	8	11
EXPENDITURE:			
By Payments into the Exchequer - - - - - - - -	11,000	–	–
Balance now in Bank - - - - - - - - - -	3,232	8	11
£.	14,232	8	11

No. 3.—THE ACCOUNT of the COMMISSIONERS of PUBLIC WORKS, *Ireland*, of all SUMS issued or entrusted to them under the Provisions of the Act 1 & 2 Will. IV, c. 33, for Grants, for One Year, ended 31 December 1834.

RECEIPT:	£.	s.	d.	£.	s.	d.	£.	s.	d.
To Balance of the last Account - - - - - - -							1,405	12	2
Loughgraney Road:									
Received from the Treasury, county Clare, first instalment - - - - - -	1,000	–	–						
Ditto - from Grand Jury, county Clare, first instalment - - - - - -	501	14	4						
Ditto - from James Malony, Esq., his final contribution - - - - -	40	–	–						
				1,541	14	4			
Derrybrien Road, (in continuation of former):									
Received from the Treasury - - - -	534	4	2						
Ditto - from Grand Jury, county Galway	372	9	–						
				906	13	2			
Loughrea Road, (in further continuation):									
Received from the Treasury - - -	1,040	–	–						
Ditto - from Grand Jury, county Galway	293	1	6						
				1,333	1	6			
Castlerea Road, (by Ballygar) - - -					—				
Larne to Ballycastle Road:									
Received from the Treasury - - -	3,500	–	–						
Ditto - from Grand Jury, county Antrim	6,015	7	–						
				9,515	7	–			
Liscannor Bridge:									
Received from the Treasury - - -	1,200	–	–						
Ditto - from Grand Jury, county Clare	702	8	2						
				1,902	8	2			
Kenmare Road (county Cork):									
Received from the Treasury - - -	1,087	16	–						
Ditto - from Grand Jury - - -	1,007	12	6						
				2,095	8	6			
Kenmare Road (county Kerry):									
Received from the Treasury - - -	3,115	18	–						
Ditto - from Grand Jury - - -	2,524	2	8						
				5,640	–	8			
Fivemiletown Road:									
Received from the Treasury - - -	1,028	–	–						
Ditto - from Grand Jury, county Fermanagh - - - - - -	1,511	8	4						
				2,539	8	4			

RECEIPT—*continued.*

			£. s. d.
Glenstal Mountains Road:		£. s. d.	
Received from the Treasury - - - - -		700 – –	
Portumna to Mountshannon Road:			
Received from the Treasury - - -	900 – –		
Ditto - from Grand Jury, county Galway,	907 12 2		
		1,807 12 2	
Centinaveena to Dromahare Road:			
Received from the Treasury - - -	500 – –		
Ditto - from Grand Jury, county Leitrim,	500 – –		
		1,000 – –	
Tomgraney to Killaloe Road:			
Received from the Treasury - - -	650 – –		
Ditto - from Grand Jury, county Clare -	351 4 –		
		1,001 4 –	
Mallins to Guidore Road:			
Received from the Treasury - - -	723 10 8		
Ditto - from Grand Jury, Donegal -	755 11 3		
		1,479 1 11	31,461 19 9
		£.	32,867 11 11

EXPENDITURE: viz.

By	£ s. d.
Longhgraney Road: Contractor's accounts for works executed - - - - -	599 7 9
Derrybrien Road: Contractor, for works executed - - - - - - -	277 15 4
Longhrea Road: Contractor, for works executed - - - - - - -	240 1 11
Castlerea Road: Contractor, for works executed - - - - - - -	50 – –
Larne to Ballycastle Road: Labour, wages and materials - - - - - - - -	10,164 6 7
Liscannor Bridge: Contractor, for works executed - - - - - - -	988 14 6
Kenmare Road (county Cork): Labour, wages and materials - - - - - - - -	2,076 5 5
Kenmare Road (county Kerry): Labour, wages and materials - - - - - - - -	5,362 2 7
Fivemiletown Road: Contractor, for works executed - - - - - - -	2,613 13 4
Glenstal Road: Contractor, &c. per agreement - - - - - - -	341 12 –
Portumna Road: Contractor, for works executed - - - - - - -	912 19 2
Centinaveena Road: Contractor, for works executed - - - - - - -	747 8 6
Tomgraney Road: Labour, wages and materials - - - - - - - -	1,046 7 1
Mallin's Road: Labour, wages, materials and contract - - - - - -	762 11 5
	26,183 5 7
BALANCE - - - - -	6,684 6 4
£.	32,867 11 11

No. 4.—THE ACCOUNT of the COMMISSIONERS of PUBLIC WORKS, *Ireland*, of all Sums issued or entrusted to them, for SALARIES and INCIDENTS of OFFICE, from 1st January to 31st December 1834.

RECEIPT:

	£.	s.	d.	£.	s.	d.
To Balance of last Account	651	8	9			
Received from the Treasury for Salaries and Incidents of Office	4,000	–	–			
Received in repayment of advances (last Account)	250	–	–			
				4,901	8	9
Deposits, viz.						
Appearing as a Balance on last Account	603	18	3			
Received from parties making application for Loans or Grant, being for the purpose of defraying the usual preliminary expenses of Engineer or Law Agent	563	2	2			
				1,167	–	5
			£	6,068	9	2

ABSTRACT:

	£.	s.	d.	£.	s.	d.
Balances	651	8	9			
Ditto	603	18	3			
				1,255	7	–
Receipts	4,250	–	–			
Ditto	563	2	2			
				4,813	2	2
			£.	6,068	9	2

EXPENDITURE.

	£.	s.	d.	£.	s.	d.	£.	s.	d.
By Salaries of the Establishment	£. 2,305	8	4						
Allowances, incidental, to persons not on the Establishment	74	3	8						
Postage	255	–	5						
Incidents of Office, including coals, candles, &c.	116	16	7						
				2,751	9	–			
Travelling and other Expenses, incidental upon the execution of the Act	171	6	9						
Law Expenses	214	4	2						
Expenses incurred in execution of special orders from Government	69	3	3						
				454	14	2			
				3,206	3	2			
Advances to Engineers and others, sums to be repaid by parties				344	16	10			
*One Year's Insurance on Life of N. D. Crommelin, Esq.				330	–	–			
Balance				1,020	8	9			
							4,901	8	9
Deposits paid to Engineers and others for services arising out of applications for Loans or Grants	526	4	7						
Law Expenses, for same	108	1	8						
				634	6	3			
Balance				532	14	2			
							1,167	–	5
						£.	6,068	9	2

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* At the close of the last Account this item was represented as about to cease, and its recurrence has only been occasioned by the proposal on the part of Mr. C. of some new arrangements for its settlement.

ABSTRACT:

	£.	s.	d.	£.	s.	d.
Payments	3,881	–	–			
Ditto	634	6	3			
				4,515	6	3
Balances	1,020	8	9			
Ditto	532	14	2			
				1,553	2	11
			£.	6,068	9	2

No. 5.—THE ACCOUNT of the COMMISSIONERS of PUBLIC WORKS, *Ireland,* of all SUMS issued or entrusted to them under the Act of 40 Geo. 3, c. 51, for INLAND NAVIGATION, in Year ended 31 December 1834.

RECEIPT:

	£.	s.	d.	£.	s.	d.
To Balance of last Account				1,018	3	7
Received from Treasury, Vote of 1834				1,365	–	–
Tolls collected on Navigations, as follows; viz.						
Tyrone	£. 105	7	1			
Upper Shannon	92	9	7			
Lower Boyne, commencing 1st August	290	1	4			
Maig River	29	16	8			
				517	14	8
Rent of house, No. 11, Merrion-street, let to Mr. Thompson				52	15	–
From Commissioners Public Works, on account of Loan of 1,750*l.* by Sale of Exchequer Bill issued				500	12	6
			£.	3,454	5	9

EXPENDITURE:

	£.	s.	d.	£.	s.	d.
By Tyrone Navigation and Maghery; viz.						
Salaries and allowances	109	3	1			
Labour, materials, &c.	74	9	1			
				183	12	2
By Upper Shannon Navigation:						
Salaries and allowances	248	9	5			
Labour, materials, &c.	780	7	2			
				1,028	16	7
By Lower Boyne Navigation, from 1st August:						
Salaries and allowances	39	4	4			
Labour, materials, &c.	192	5	8			
				231	10	–
By Maig River Navigation:						
Salaries				33	14	–
By Lough Derg:						
Contract for care of buoys and beacons				24	–	–
By House Rents:						
One year's rent of No. 11, Merrion-street, the late office				221	1	6
				1,722	14	3
Balance				1,731	11	6
			£.	3,454	5	9

No. 6.—THE ACCOUNT of the COMMISSIONERS of PUBLIC WORKS, *Ireland*, of all SUMS issued or entrusted to them, under the 1 Will. IV. c. 84, and former Acts, for the Improvement and Encouragement of IRISH FISHERIES, for One Year, ended 31st December 1834.

RECEIPT:

	£.	s.	d.	£.	s.	d.
To Piers' Fund:						
Balance of last Account - - - - - -	11,062	17	2			
Received from Treasury amount issued under the Act - - - - - - - - -	1,500	–	–			
				12,562	17	2
To Loan Fund:						
Balance of last Account - - - - - - - -				7,067	–	3
			£.	19,629	17	5

EXPENDITURE:

	£.	s.	d.	£.	s.	d.	£.	s.	d.
By Piers' Fund, Building and Repairs; viz.									
Ardfry - - - - - -	£. 20	–	–						
Barna - - - - - -	36	–	–						
Brandon - - - - - -	5	8	–						
Burren - - - - - -	8	–	–						
Carrigaholt - - - - -	61	6	10						
Clonakilty - - - - -	32	61	–						
Cloonile - - - - - -	50	–	–						
Carrickfergus - - - - -	208	2	4						
Courtnasherry - - - - -	25	10	–						
Derryinver - - - - -	80	–	–						
Dunbeg - - - - - -	3	–	–						
Galway (Slate Pier) - - - -	64	–	–						
Greencastle - - - - -	10	4	–						
Kenmare - - - - - -	1	10	–						
Killery - - - - - -	9	16	7						
Leenane - - - - - -	39	15	4						
Newcastle - - - - -	83	4	–						
Portmore - - - - - -	395	10	11						
Portmuck - - - - -	78	3	–						
Renard - - - - - -	47	6	–						
Roundstone - - - - -	16	–	–						
Saleen - - - - - -	19	4	–						
Tarmon - - - - - -	13	4	–						
Wyse's Point - - - - -	183	6	8						
				1,491	7	8			
Incidents, including superintendence of engineers, &c. -				341	12	1			
By Loan Fund:							1,832	19	9
Incidents, including law expenses - - - -				51	11	2			
Amount of London Charitable Loan, contributed in 1826, and now refunded by order of the Lords of the Treasury - - - - - - -				4,236	13	11			
							4,288	5	1
By Balance of Piers' Fund - - - - -				10,729	17	5			
of Loan Fund - - - - -				2,778	15	2			
							13,508	12	7
						£.	19,629	17	5

No. 7.—THE ACCOUNT of the Commissioners of Public Works, *Ireland*, of all Sums issued or entrusted to them, under the provisions of the Act 6 Geo. 4, c. 101, for maintaining, repairing and keeping in repair certain Roads and Bridges, from 1st January 1834 to 31st December 1834.

RECEIPT:	£.	s.	d.	£.	s.	d.
To Balance of last Acconnt, on 31st December 1833				305	3	10
Received from the Treasury, under warrant of Lord Lieutenant, and upon requisition of Commissioners				9,500	–	–
Received by fines levied for damage or nuisance on certain roads, and placed to credit of counties respectively; viz.						
Cork	1	19	–			
Kerry	1	14	–			
Limerick	2	1	6			
				5	14	6
£.				9,810	18	

EXPENDITURE:	£.	s.	d.	£.	s.	d.
By Payments on account of labour, wages and materials, in maintaining and keeping in repair certain roads in counties following, (the amount to be levied by presentment respectively); viz.						
Clare	£. 2,268	6	2			
Cork	1,207	19	–			
Galway	2,074	15	5			
Kerry	529	11	10			
Limerick	310	4	1			
Leitrim	21	11	7			
Mayo	1,488	12	–			
Roscommon	177	11	9			
Tipperary	613	4	5			
				8,691	16	3
Balance				1,119	2	1
£.				9,810	18	4

No. 8.—THE ACCOUNT of the Commissioners of Public Works, *Ireland*, of all Sums received or expended in the repairs and maintenance of certain Roads and Bridges under Contract, ended 31st December 1834.

RECEIPT:	£.	s.	d.	£.	s.	d.
Mullingar Turnpike Road:						
To amount three instalments due under contract	1,343	6	9			
Balance	58	1	–			
				1,401	7	9
Navan Turnpike Road:						
To amount one instalment under contract due	375	–	–			
Balance	60	14	7			
				435	14	7
£.				1,837	2	4

EXPENDITURE:	£.	s.	d.	£.	s.	d.
Mullingar Turnpike Road:						
By payments on account of labour, wages and materials	1,350	12	11			
superintendence	39	–	4			
tools and implements	11	14	6			
				1,401	7	9
Navan Turnpike Road:						
By payments on account of labour, wages and materials	411	4	7			
superintendence	16	2	–			
tools and implements	8	8	–			
				435	14	7
£.				1,837	2	4

No. 9.—THE ACCOUNT of the Commissioners of Public Works, *Ireland*, of a Sum issued for the Repairs of Post Roads, under the Act of 4 and 5 Will. IV. c. 91, ended 31 December 1834.

Received,	
To amount issued on account - - - - - - - -	£. 1,000 - -
Expended (Nil.)	
By Balance in Bank for purposes of this Account - - - -	£. 1,000 - -

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No. 10.—THE ACCOUNT of the Commissioners of Public Works, *Ireland*, for Monies received and expended on account of the Parliamentary Grant of last Session, £. 13,000. for the completion of certain Roads and Bridges, in the counties of Galway and Mayo; commencing , ending 31st December 1834.

	£.	s.	d.	£.	s.	d.
RECEIPT:						
To amount issued from the Treasury, on account - - - - - -				2,000	-	-
EXPENDITURE:	£.	s.	d.			
By county Galway, superintendence on setting to work -	39	17	1			
labour in repairs Kylmore Road - -	60	2	5			
				99	19	6
By county Mayo, superintendence, on setting to work - - - - -				66	10	2
By arrears paid James O'Loughlin, late pay clerk Western District, by order of the Lord Lieutenant, being an amount appearing due at foot of his accounts, as certified by the Audit Commission - - - - - - - - -	431	4	5			
By arrears paid Mathew Morris and James Rigney, their contract for works executed, same district, now paid by order of Lord Lieutenant - - - - - - -	25	-	-			
				456	4	5
			£.	622	14	1
Balance - - - -				1,377	5	11
			£.	2,000	-	-

No. 11.—THE ACCOUNT of the Commissioners of Public Works, *Ireland*, of all Sums issued or entrusted to them, as Commissioners of Phœnix Park and Dublin Buildings, from 1st January to 31st December 1834.

		£.	s.	d.
RECEIPT:				
To Balance, from last account - - - - - - -		1,394	9	9
Received from Treasury amount of Vote 1833 - - - -		15,600	-	-
Rent of house, Garter-court - - - - -		21	15	-
Woods and Forests; viz.				
Towards new road, deputy bailiffs, &c.	£. 1,000 - -			
For ordinary services, half year ended 30th September - - - -	1,020 - -			
		2,020	-	-
	£.	19,036	4	9

EXPENDITURE:				£.	s.	d.
By Payments to tradesmen and labourers and others employed in care and maintenance; viz.						
	£.	s.	d.			
Phœnix Park, Vice-regal and other domains and lodges - - - - - - - -	5,674	14	1			
Dublin Castle - - - - - - - -	5,663	6	1			
Four Courts - - - - - - - -	2,545	19	1			
Custom House - - - - - - - -	762	14	5			
New Stables, (Castle-garden) - - - - -	599	13	7			
Marshalsea - - - - - - - -	490	11	1			
Insolvent Coort - - - - - - -	218	9	-			
Record Buildings, (Henrietta-street) - - -	154	9	8			
Account Office, the late, (Foster-place) - -	29	10	6			
Irishtown Church - - - - - - -	13	17	7			
Adjutant-general's Office - - - - -	3	14	8			
Quartermaster's Office - - - - - -	15	11	7			
Lodging allowance - - - - - - -	46	3	-			
Incidents - - - - - - - -	104	5	-	16,322	19	4
Woods and Forests; viz.						
New Road, (completed) - - - - - -	419	16	4			
Deputy Bailiff's house, (completed) - -	361	11	8			
Ordinary services, repairs, &c., to 30th September, (when given up) - - - - -	872	16	-	1,654	4	-
				17,977	3	4
Balance - -				1,059	1	5
			£.	19,036	4	9

No. 12.—THE ACCOUNT of the Commissioners of Public Works, *Ireland*, of all Sums issued or entrosted to them, as Commissioners of Kingstown Harbour, from 1st January to 31st December 1834.

RECEIPT:	£.	s.	d.	£.	s.	d.
To Received from Treasury, balance Vote of 1833 -	12,720	-	-			
Ditto - part - - - 1834 -	3,000	-	-	15,720	-	-
Postmaster-general; viz.						
For repairs of packet jetty. (*See* last Account) - - -	293	1	6			
For same, hy late Commissioners, (1830) - - - - -	309	-	9	602	2	3
Sale of old iron - - - -	78	10	1			
Stores - - -	36	1	11			
Limestooe - - - -	47	8	4	162	-	4
			£.	16,484	2	7

EXPENDITURE:

	£.	s.	d.	£.	s.	d.
By Balance from last Account				186	–	5
Payments to the contractors for stone materials, labour included, also including the building of New Wharf	9,502	18	7			
Main sewer, (now completed)	307	19	9			
Boatmen, watchmen, &c.	489	15	8			
Salaries, engineer, overseer of works, &c. &c.	555	6	–			
Rents, taxes, &c.	194	7	10			
Lighthouse	125	–	–			
New moorings	114	12	–			
Law expenses	169	1	5			
Stores, coals, &c.	10	17	6			
Incidents, including repairs of buildings, &c.	222	17	10			
Compensation, granted on the retirement from office of R. Toutcher, Esq.	400	–	–			
Gratuity towards new hospital	50	–	–			
Experiments in building retaining walls	195	13	10			
				12,338	10	5
Balance of this Account unexpended				3,959	11	9
£.				16,484	2	7

No. 13.—THE ACCOUNT of the COMMISSIONERS of PUBLIC WORKS, *Ireland*, of all Sums issued or entrusted to them for DUNMORE HARBOUR; from 1st January to 31st December 1834.

RECEIPT:

	£.	s.	d.
Balance of the last Account	2,504	9	7
Received from Treasury, on account Vote of 1834	3,000	–	–
£.	5,504	9	7

EXPENDITURE:

	£.	s.	d.	£.	s.	d.
Payments to contractors and others; viz.						
Stone materials, labour included	2,443	10	11			
Salaries and allowances to engineers, &c.	233	8	1			
Incidents, including 95 *l.* 5 *s.* 3 *d.* expenses of mooring chains for harbour	105	2	6			
				2,782	1	6
Balance				2,722	8	1
£.				5,504	9	7

Jos. C. Walker,
Accountant.

[N.B.—*The Plans and Sections referred to, are not Printed.*]

PUBLIC WORKS, IRELAND.

THIRD ANNUAL REPORT

FROM THE

BOARD OF PUBLIC WORKS IN IRELAND.

Ordered, by The House of Commons, to be Printed,
23 *March* 1835.

76.

MAPS AND PLANS

ACCOMPANYING THE

THIRD ANNUAL REPORT

FROM THE BOARD OF

PUBLIC WORKS IN IRELAND.

Ordered, by The House of Commons, *to be Printed,*
27 *March* 1835.

76
(*continued.*)

LIST OF PLANS.

No.

1. Map of Government Roads through a Mountain District, in Counties of Clare and Galway.
2. Dunmore Harbour.

Antrim Coast Road.

3. Plan of Road from Larne to Ballycastle.
4. Section of Road on level ground.
5. Ditto of Craig Wulard.
6. Glen Claudee Bridge and Embankment.
7. Retaining Walls, Carey Mountain.
8. Sections of ditto.
9. Ditto of Barnice ma Gee, Carey Mountain.
10. Ditto of Deadman's Grave.
11. Ditto of Lough a Veun.
12. Ditto of - ditto.
13. Ditto of a Bog Road.
14. Plan of a Bog Knife.
15. Plan of Coretavey Bridge.
16. Elevation of ditto.
17. Tables.

Kingstown Railway.

18. Plan of Buffing Apparatus, first used on Liverpool and Manchester Railway.
19. Section of ditto, used on Dublin and Kingstown Railway.
20. Elevation of a Carriage for Passengers fitted with Buffing Apparatus.

Drogheda Harbour.

21. Chart of the River Boyne from Drogheda to the Sea.
22. Longitudinal Section of ditto } on one sheet.
23. Transverse Section of ditto }

Harbour of Ballyshannon.

24. Plan of Bar and Entrance of Harbour of Ballyshannon.

Barrow Navigation.

25. Plan and Section of Barrow Navigation from Athy to New Ross.
26. Ditto - ditto - of New Canal at Cloghrennan.
27. Ditto - ditto - of New Lock at - - ditto.

Canal from Enniscorthy to Wexford.

28. Plan and Section of an intended Canal from Enniscorthy to Wexford.

Henry R. Paine, Sec.

GOVERNMENT ROADS IN CLARE

MAP

[illegible]

CLARE & GALWAY

[illegible]

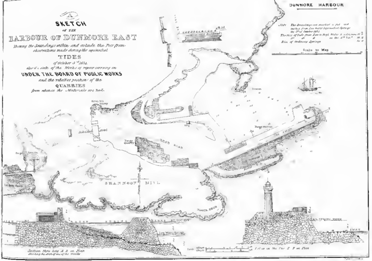
PORTUMNA and GORT

LOUGHREA and TULLA

[illegible]

[illegible]

[illegible] C.E.


A
SKETCH
of the
HARBOUR OF DUNMORE EAST
Shewing the Soundings within and outside the Pier from observations made during the equinoctial
TIDES
of October 3rd 1834.
also the state of the Works of repair carrying on
UNDER THE BOARD OF PUBLIC WORKS
and the relative position of the
QUARRIES
from whence the Materials are had.
DUNMORE HARBOUR
Note The Soundings are marked in feet and inches from Low Water Equinoctial Springs the 3rd of October 1834
The Rise of Tide from Low to High Water Equinoctial Springs
Rise of Ordinary Springs
Scale to Map
Quarry
Tram Road
Torque Quarry
SHANNOON MILL
BLACK KNOB
Section thro line A B on Plan Shewing the Arch of one of the Vaults
Water Spring Tides
Low Water
Section on the Pier E F on Plan
High Spring Tides
Scale

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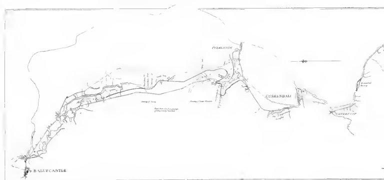
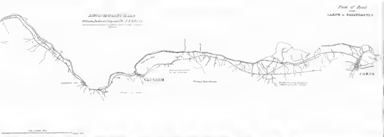

CUSHENDUN
CUSHENDALL
WATERFOOT
BALLYCASTLE



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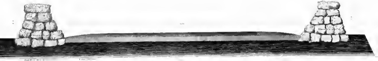
ANTRIM COAST ROAD

Section of Road

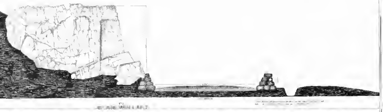
on

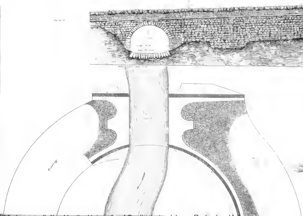
LEVEL GROUND



SECTION LEVEL GROUND

THE
SECTION OF
CRAIG WULLARD

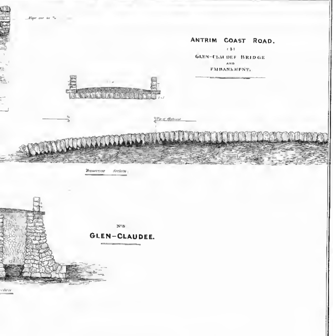




ANTRIM COAST ROAD.

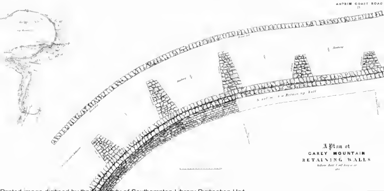
(1)

GLEN-CLAUDEE BRIDGE
AND
EMBANKMENT.



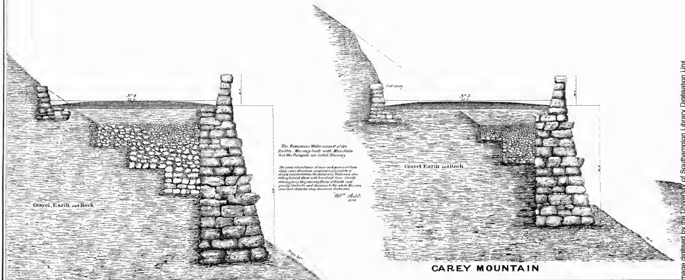
No. 5

GLEN-CLAUDEE.



A Plan of
CAREY MOUNTAIN
RETAINING WALLS

CAREY MOUNTAIN



The Retaining Walls consist of dry Rubble Masonry built with Mica Slate but the Parapets are Solid Masonry

The great abundance of loose and quarried stone along Carey Mountain afforded every facility of deeply counterforting the Retaining Walls and also filling behind them with handlaid stone thereby diminishing the pressing Prism of Earth and giving stability and duration to the whole Masonry executed along the steep Mountain declivities

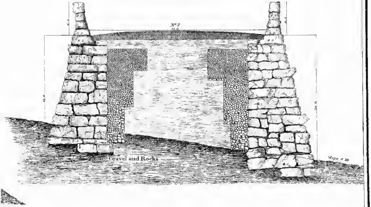
Will^{m} Sadd
1836

Antrim Coast Road

(6)

SECTIONS of
RETAINING WALLS
CAREY MOUNTAIN

Will^m Bald Civil Engineer
1834



Ordered by The House of Commons to be Printed 27th March 1835
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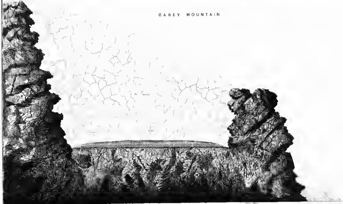


18

BARNICE NA GEE

GLENARM

The following are the results of some blasting operations on the White Limestone Blocks at Glenarm Little Deer Park. The Limestone there is much mixed with Flints. These experim[illegible] ascertain the sp[illegible] ific Gravity [illegible] 2709; 2763 and the Whinstone 2798

	Length	Breadth	Depth	Cubic feet in each Block	Quantity of powder used		
Block Nº 1	9 0	× 7 6	× 6 6	340	36 oz.	14	97
2	6 0	× 5 0	× 5 0	150	12 oz.	13	10
3	12 0	× 9 0	× 12 0	64½	60 oz.	15	50
4	6 0	× 6 0	× 5 0	180	12 oz.	15	00

From the above experiments it took one ounce of powder to rend asunder 14.72 Cubic feet of the White Limestone when in blocks. And from experiments made on the solid loose Whinstone Blocks it took about one ounce of gun powder to blast asunder 11.78 Cubic feet.

In blasting down the large masses of [illegible] Rocks [illegible] near Drumnagee and [illegible] as represented in the [illegible] annexed [illegible] near the sea [illegible] the [illegible] these being together double [illegible] from [illegible] the quantities [illegible] hundred thousand tons of White Limestone have been blasted down [illegible] The [illegible] made into the Toe of the Rocks were always planned that the line of least resistance should not be in the direction of the line of being Several hundred tons of rock rested on a face [illegible] much [illegible] one hundred down. Particular detailed instructions were drawn up by Count Morgoros at the beginning [illegible] operations and the patent Safety Fuse was also introduced by him, which has been attended [illegible] and [illegible] throughout the charges

W. Bald Civil Engineer

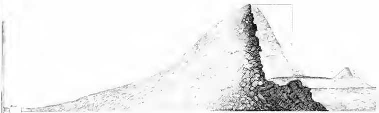
ANTRIM COAST ROAD

(7)

Sections of Barmee na Gee

CARFY MOUNTAIN

Ancient White Limestone



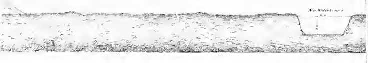
Antrim Coast Road

(9)

SECTIONS of
DEAD MAN'S GRAVE

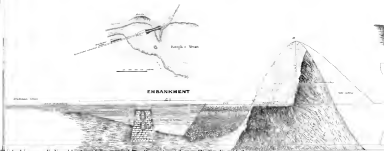
Willm Bald Civil Engineer

1835



Ordered by The House of Commons to be Printed 27th March 1835
James and Luke G. Hansard & Sons Printers

S. Arrowsmith Lithog.



EMBANKMENT

Antrim Coast Road

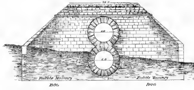
(9)

SECTIONS of

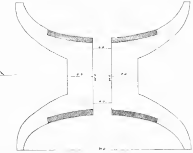
LOUGH-A-VEUN.

Willm Bald Civil Engineer

1834



Bridge in Lough-a-Veun

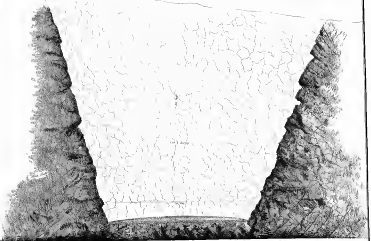


Ordered by The House of Commons to be Printed 22nd March 1835

James and Luke G. Hansard & Sons Printers

J. Arrowsmith Lithog

Sections
of
LOUGH A VEUN



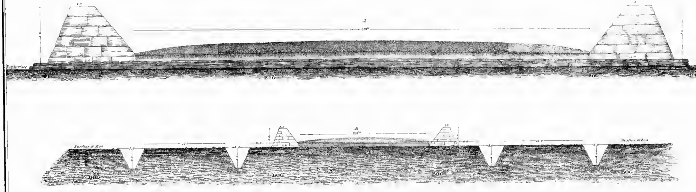
LOUGH A VEUN

Nº II

SECTION OF A BOG ROAD.

Will^m Bald Civil Engineer F R S E & M R I A &c

1834

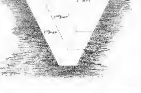


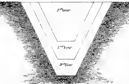
([illegible])

II

SECTIONS OF
A BOG ROAD.

Will.m Bald, Civil Engineer
1835



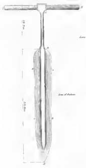


BOG DRAINS

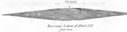
Ordered by The House of Commons to be Printed 27th March 1835
James and Luke G. Hansard & Sons Printers

Arrowsmith Lithog.

Plan
of a
BOG KNIFE



Transverse Section of Shank C D
full size



Transverse Section of Blade D E
full size

A Knife lately invented for cutting Drains through soft wet fibrous Bog

---

It has been found, on experience in the Rural operations in the County of Antrim that two such Bog Knives will cut and perform as much work as six Spades and is therefore a great saving of labour in cutting drains through soft wet Bog. The Knife will cut both vertically and also nearly horizontally. It is admirably adapted for marking out and levelling lines over boggy surfaces.

Description of Knife.

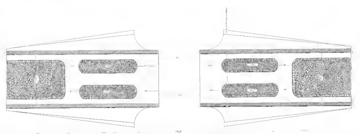
The handle A B consists of ash two feet long, and passes through an iron eye at C. The shank from C to D consists of iron one foot long and nearly one inch square as represented in the Transverse Section F. The blade D E is three feet long 4½ inches broad and half an inch thick in the middle as described and shown in the Transverse Section G. Both sides of the blade e e e e are steeled and quite sharp and will cut fibrous bog with great rapidity. The Knives are sometimes made smaller than the above dimensions.

Parties of three men are generally employed in making and sinking Bog drains, one cutting vertically, another nearly horizontally and a third with a Pronged Graip lifting and throwing out the pieces of Bog cut by the two men working with the Knives.

William Bald, Civil Engineer

The handle A B is sometimes placed at right angles with the flat of the blade.

Ordered by the House of Commons to be Printed 23rd March 1834



ANTRIM COAST ROAD

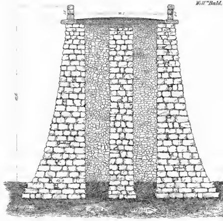
(13)

Plan of

CORETAVY BRIDGE

Willm Bald, Civil Engineer, F.R.S.E. & M.R.I.A. &c.

1834.

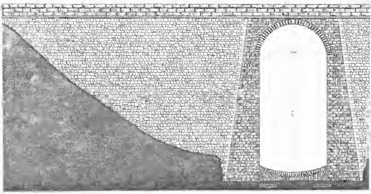


Transverse Section

Ordered by the House of Commons to be Printed 27th March, 1835.

Standidge & Lemon, Litho

James & Luke G. Hansard & Sons, Printers



Sol of Rubble Masonry
Trappean Rough dressed Block
of Sandstone

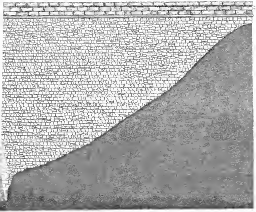
CORETAVY

Designed & Executed under the Direction of
William Bald, Civil Engineer F R S E & M R I A &c.

ANTRIM COAST ROAD.

(14)

Elevation of CORETAVY BRIDGE.



47 feet high
156 feet long

0° 1′ one in	3438	0° 37′ one in	92	1° 13′ one in	47.08	1° 49′ one in	31 54	2° 25′ one in	23 71
0° 2′ D°	1718	0° 38′ D°	90	1° 14′ D°	46 45	1° 50′ D°	31 25	2° 26′ D°	23 55
0° 3′ D°	1146	0° 39′ D°	88	1° 15′ D°	45 83	1° 51′ D°	30 97	2° 27′ D°	23 38
0° 4′ D°	859	0° 40′ D°	85	1° 16′ D°	45 24	1° 52′ D°	30 69	2° 28′ D°	23 23
0° 5′ D°	687	0° 41′ D°	83	1° 17′ D°	44 64	1° 53′ D°	30 43	2° 29′ D°	23 07
0° 6′ D°	572	0° 42′ D°	81	1° 18′ D°	44 08	1° 54′ D°	30 15	2° 30′ D°	22 92
0° 7′ D°	491	0° 43′ D°	79	1° 19′ D°	43 51	1° 55′ D°	30 00	2° 31′ D°	22 77
0° 8′ D°	429	0° 44′ D°	78	1° 20′ D°	42 95	1° 56′ D°	29 63	2° 32′ D°	22 62
0° 9′ D°	381	0° 45′ D°	76	1° 21′ D°	42 44	1° 57′ D°	29 39	2° 33′ D°	22 48
0° 10′ D°	343	0° 46′ D°	74	1° 22′ D°	41 94	1° 58′ D°	29 13	2° 34′ D°	22 33
0° 11′ D°	312	0° 47′ D°	73	1° 23′ D°	41 42	1° 59′ D°	28 90	2° 35′ D°	22 18
0° 12′ D°	286	0° 48′ D°	71	1° 24′ D°	40.94	2° 0′ D°	28 69	2° 36′ D°	22 04
0° 13′ D°	264	0° 49′ D°	70	1° 25′ D°	40 45	2° 1′ D°	28 40	2° 37′ D°	21 96
0° 14′ D°	245	0° 50′ D°	68	1° 26′ D°	39 96	2° 2′ D°	28 18	2° 38′ D°	21 76
0° 15′ D°	229	0° 51′ D°	67	1° 27′ D°	39 52	2° 3′ D°	27 94	2° 39′ D°	21 62
0° 16′ D°	214	0° 52′ D°	66	1° 28′ D°	39 06	2° 4′ D°	27 73	2° 40′ D°	21 49
0° 17′ D°	202	0° 53′ D°	64	1° 29′ D°	38 63	2° 5′ D°	27 50	2° 41′ D°	21 35
0° 18′ D°	190	0° 54′ D°	63	1° 30′ D°	38 19	2° 6′ D°	27 29	2° 42′ D°	21 22
0° 19′ D°	180	0° 55′ D°	62	1° 31′ D°	37 86	2° 7′ D°	27 07	2° 43′ D°	21 09
0° 20′ D°	171	0° 56′ D°	61	1° 32′ D°	37 37	2° 8′ D°	26 66	2° 44′ D°	20 97
0° 21′ D°	163	0° 57′ D°	60	1° 33′ D°	36 95	2° 9′ D°	26 65	2° 45′ D°	20 82
0° 22′ D°	156	0° 58′ D°	59	1° 34′ D°	36 57	2° 10′ D°	26 44	2° 46′ D°	20 71
0° 23′ D°	149	0° 59′ D°	58	1° 35′ D°	36 17	2° 11′ D°	26 24	2° 47′ D°	20 59
0° 24′ D°	143	1° 0′ D°	57 30	1° 36′ D°	35 81	2° 12′ D°	26 05	2° 48′ D°	20 47
0° 25′ D°	137	1° 1′ D°	56 35	1° 37′ D°	35 43	2° 13′ D°	26 85	2° 49′ D°	20 36
0° 26′ D°	132	1° 2′ D°	55 48	1° 38′ D°	35 08	2° 14′ D°	25 66	2° 50′ D°	20 25
0° 27′ D°	127	1° 3′ D°	54 56	1° 39′ D°	34 72	2° 15′ D°	25 45	2° 51′ D°	20 112
0° 28′ D°	122	1° 4′ D°	53 71	1° 40′ D°	34 38	2° 16′ D°	25 27	2° 52′ D°	19 99
0° 29′ D°	118	1° 5′ D°	52 89	1° 41′ D°	34 03	2° 17′ D°	25 10	2° 53′ D°	19 88
0° 30′ D°	114	1° 6′ D°	52 08	1° 42′ D°	33 71	2° 18′ D°	24 92	2° 54′ D°	19 76
0° 31′ D°	110	1° 7′ D°	51 31	1° 43′ D°	33 37	2° 19′ D°	24 74	2° 55′ D°	19 65
0° 32′ D°	107	1° 8′ D°	50 56	1° 44′ D°	33 06	2° 20′ D°	24 55	2° 56′ D°	19 53
0° 33′ D°	104	1° 9′ D°	49 85	1° 45′ D°	32 76	2° 21′ D°	24 39	2° 57′ D°	19 43
0° 34′ D°	101	1° 10′ D°	49 11	1° 46′ D°	32 44	2° 22′ D°	24 21	2° 58′ D°	19 31
0° 35′ D°	98	1° 11′ D°	48 40	1° 47′ D°	32 13	2° 23′ D°	24 05	2° 59′ D°	19 21
0° 36′ D°	96	1° 12′ D°	47 75	1° 48′ D°	31 82	2° 24′ D°	23 87	3° 00′ D°	19 105

Calculated by Charles Bald

Table for Road Surveys calculated from one minute to three degrees

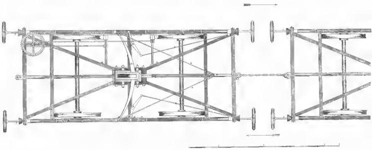
William Bald

ANTRIM COAST ROAD (10)

TABLES

[illegible]

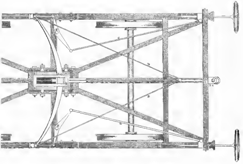
FIG 1



Plan of the Buffing Apparatus first used on the Liverpool and Manchester Railway

(1)

DUBLIN AND KINGSTOWN
RAILWAY.



y

(2)

DUBLIN AND KINGSTOWN RAILWAY

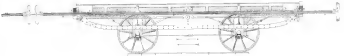
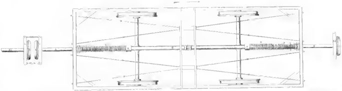


Fig 2

SECTION SHEWING THE BUFFING APPARATUS ADOPTED ON THE DUBLIN AND KINGSTOWN RAILWAY COACHES

PLAN OF A CARRIAGE FRAME WITH THE BUFFING APPARATUS USED ON THE DUBLIN AND KINGSTOWN RAILWAY

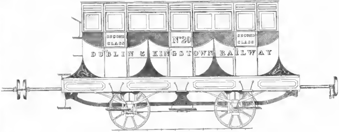
Fig 1



(3)

DUBLIN AND KINGSTOWN RAILWAY

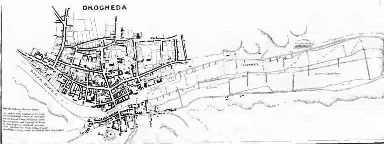
FIG. 9

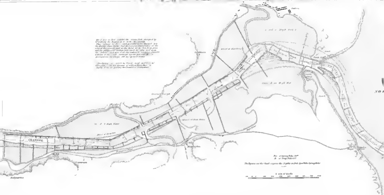


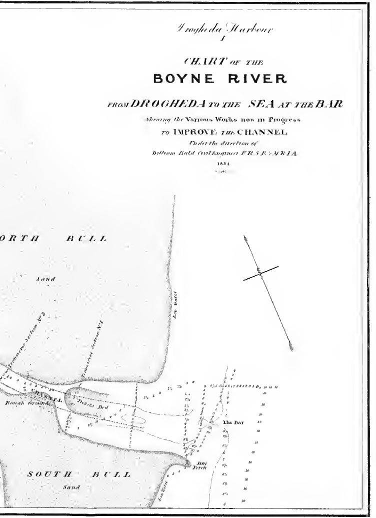
Elevation of a Passenger Carriage fitted with the Buffing Apparatus adopted on the Dublin and Kingstown Railway

Ordered by the House of Commons to be Printed March [illegible]

J. Basire Lithog


DROGHEDA
RIVER BOYNE
CHANNEL


CHANNEL
The Figures on the Chart express the Depths in Feet Low Water Spring Tides
Scale of Yards

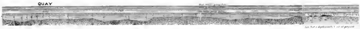


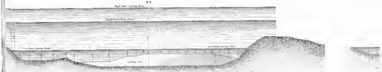
Drogheda Harbour
1

CHART of the
BOYNE RIVER
from DROGHEDA to the SEA at the BAR
Shewing the Various Works now in Progress
to IMPROVE the CHANNEL
Under the direction of
William Bald Civil Engineer F.R.S.E. & M.R.I.A.
1834

76. Ordered, by The House of Commons, to be Printed, 23rd March 1836.

S. Arrowsmith Lithog.

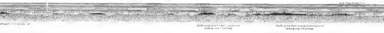

QUAY
High Water Spring Tides


No.1
High Water Spring Tides
High Water Neap Tides
Low Water Spring Tides
Low Water Spring Tides
Cutting

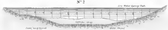
It is intended to ... open the Bed of the Channel to a depth at Low Water Spring Tides of 8 feet.

The parts shaded Dark show the portions of the Bed of the Channel now ... consist generally of Shingle mixed with Sand.

A Dredging Vessel ... by Steam ... about ... of Glasgow with an Engine ... Horse Power ... employed in deepening the Channel of Navigation

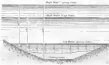

High Water Spring Tides
at present
Depth nearly ... at present
formerly only ... feet deep
Depth at Low Water nearly ... at present
formerly only ... feet deep

N° 2



TRANSVERSE SECTION

N° 3



TRANSVERSE SECTION OF CHANNEL AND RIVER

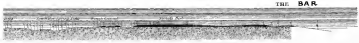
Spring
Neap

(2 & 3)

LONGITUDINAL SECTION OF THE BED OF THE BOYNE RIVER
FROM
DROGHEDA TO THE BAR:

Shewing the Improvements now going on of deepening the Channel for Ships
Under the direction of William Bald Civil Engineer F R S E & M R I A &c

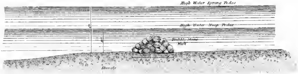
1834



The passage over Tickets Bed has a depth of nearly 6 feet at Low Water now formerly 3½ feet deep

TRANSVERSE SECTIONS OF THE BOYNE RIVER AT DROGHEDA:

Shewing the Improvements now carrying on at deepening the Channel for Ships of a Larger Class,
Under the direction of William Bald Civil Engineer F R S E & M R I A &c

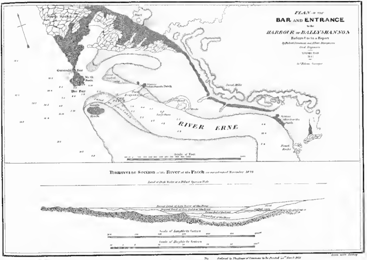


TRANSVERSE SECTION,
Rubble Stone Wall

Spring Tides rise 12 Feet
Neap Tides rise 8 Feet

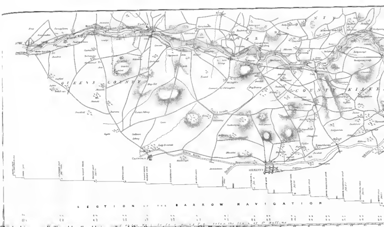
Walls of Rubble Stone are now making along the Sides of the River and parallel to the Ship Channel These Walls are covered by the Sea at High Water

Ordered by The House of Commons to be Printed 23rd March 1835
James and Luke G Hansard & Sons Printers
J Arrowsmith Lithog

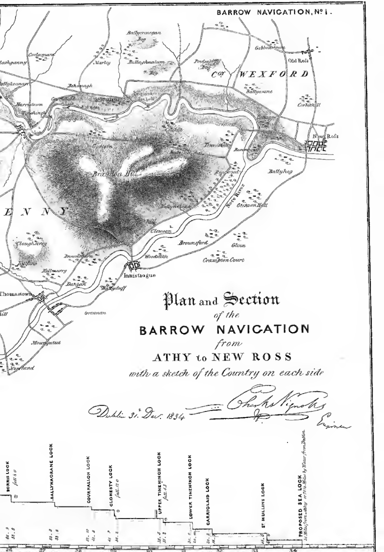


PLAN OF THE
BAR AND ENTRANCE
to the
HARBOUR OF BALLYSHANNON
Referred to in a Report
by Robert Stevenson and Alan Stevenson
Civil Engineers

Ordered by The House of Commons to be Printed March 1835
James and Luke G. Hansard & Sons Printers



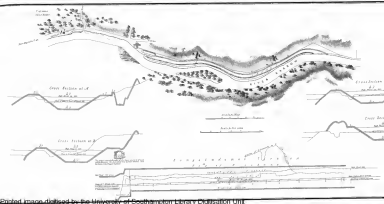
QUEEN'S COUNTY
COUNTY KILKENNY
Carlow
Castlecomer
KILKENNY
SECTION OF THE BARROW NAVIGATION



BARROW NAVIGATION, No. 1.

Plan and Section of the BARROW NAVIGATION from ATHY to NEW ROSS with a sketch of the Country on each side

Dublin 31. Dec. 1834 — Charles Vignoles Engineer

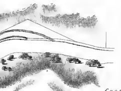

RIVER BARROW
Cross Section at A
Cross Section at B
Cross Section
Cross Sect
Scale for Map
Scale for Sections
Longitudinal Section

BARROW NAVIGATION.
(No 2)

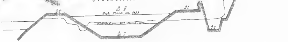
Plan and Section
of the New Piece of
CANAL now constructing near CLOGRENNAN
for the IMPROVEMENT of the NAVIGATION of the
RIVER BARROW.

Chas. Rhodes
Engineer

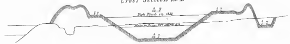
Dublin 31st December 1834

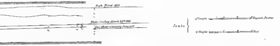


Cross Section at C



Cross Section at D





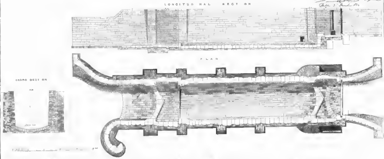
Plan and Sections

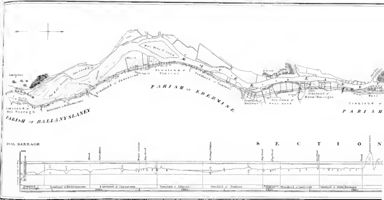
of the Lock now constructing on the New Canal near

CLOGRENNAN

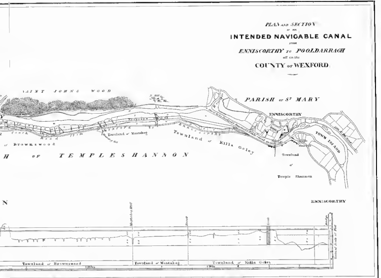
Engineer

Dublin 3 December 1834




POOL DARRAGH
Townland of Pool Darragh
Townland of Redmonstown
Townland of Jamestown
Townland of Tinteen
Townland of Tomlane
Townland of Multene
Townland of Ballinesk
Townland of Balla Barogue
Townland of
PARISH OF BALLANYSLANEY
PARISH OF EDERMINE
PARISH
RIVER SLANEY
The Lands
Mac Mine Island
POOL DARRAGH
SECTION
Townland of Redmonstown
Townland of Jamestown
Townland of Tinteen
Townland of Tomlane
Townland of Garryrek
Townland of Balla Barogue

PLAN and SECTION
of an
INTENDED NAVIGABLE CANAL
from
ENNISCORTHY to POOLDARRAGH
all in the
COUNTY of WEXFORD



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James and Luke G. Hansard & Sons Printers
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